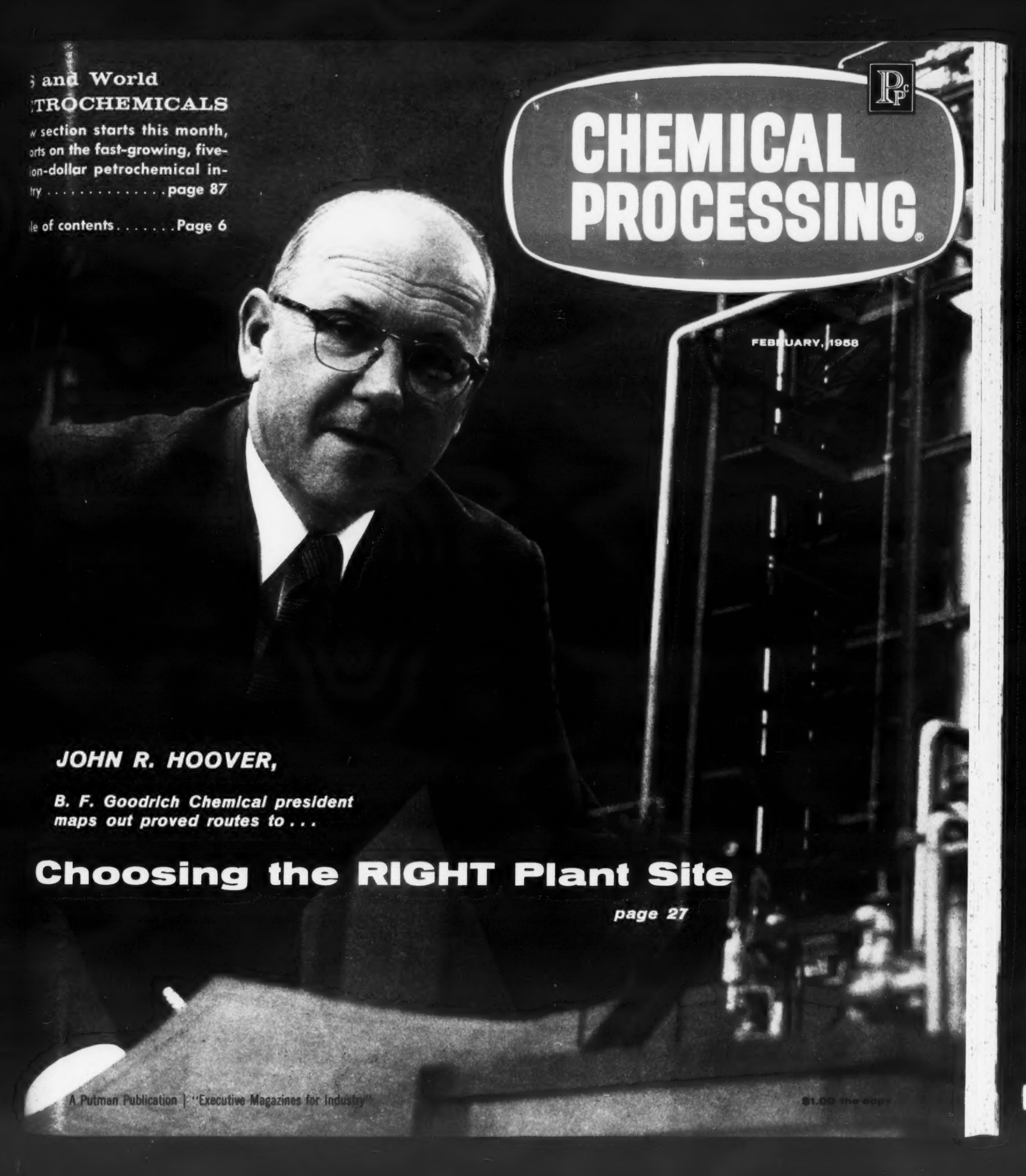

CHEMICAL PROCESSING®

FEBRUARY, 1958

...and World PETROCHEMICALS

...new section starts this month, reports on the fast-growing, five-billion-dollar petrochemical industry ..... page 87

...ble of contents ..... Page 6

JOHN R. HOOVER,

B. F. Goodrich Chemical president maps out proved routes to . . .

Choosing the RIGHT Plant Site

page 27

A Putman Publication | "Executive Magazines for Industry"

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There's an important difference in

B&A® Purified AMMONIUM SULFATE

Here's what it means to you –

Ordinary commercial Ammonium Sulfate is a by-product material. B&A *Purified* Ammonium Sulfate is not. It is produced by B&A from carefully selected raw materials . . . manufactured to rigid specifications.

Compare our typical analysis below with the Ammonium Sulfate you are now using. You'll see that B&A Purified Ammonium Sulfate is extremely low in iron, lead and arsenic, thus providing superior quality for high purity end products. Also, its crystals are highly uniform in size, and it flows freely.

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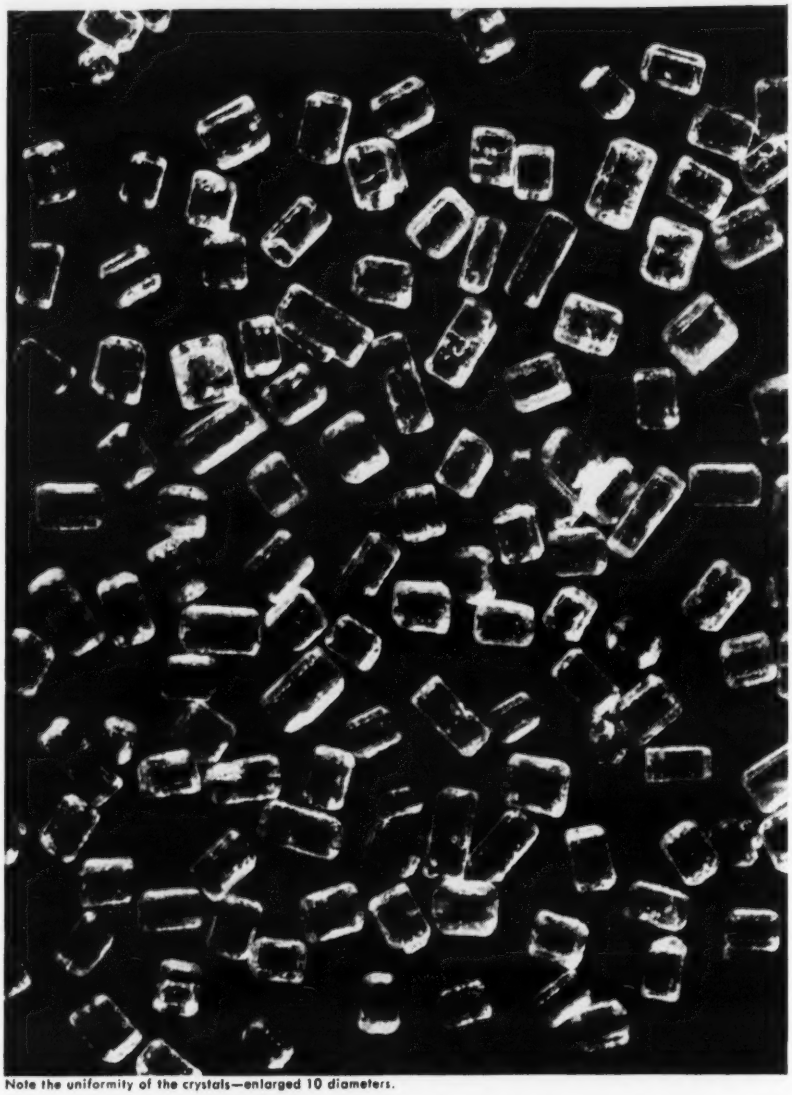
B&A AMMONIUM SULFATE, PURIFIED

Typical Analysis:

Assay $(NH_4)_2SO_4$	99.5	%
Insoluble	0.005	%
Residue after Ignition	0.01	%
Chloride (Cl)	0.001	%
Phosphate (PO_4)	0.001	%
Arsenic (As)	less than 0.00005	%
Heavy Metals (as Pb)	0.0002	%
Iron (Fe)	0.0005	%



Note the uniformity of the crystals—enlarged 10 diameters.

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Check 3326 opposite last page.

that's interesting

Age-old study

Study of isotopes, hydrogen-3 (tritium), helium-3, postassium-40, and argon-40, in meteorites has enabled scientists to conclude that they have been traveling for possibly 240-280 million years with a 4.2-billion-year-life before that. By measuring ratio of these isotopes of potassium and argon they were able to estimate that the age of meteorites were about the same age as the earth and other planets in our solar system—between 4 and 4.5 billion years. Travel time was figured by estimating how long cosmic rays had been acting to produce helium-3 and causing hydrogen-3 to decay to helium-3.

Plastic aid for blind

An effective drawing kit is available which produces raised lines on thin plastic film which can be easily read by the blind. Until development of this system, a tracing wheel such as seamstresses employ was standard procedure. This was inconvenient since it resulted in a reverse drawing. Kit consists of a ball point pen and polyester film clamped to a rubber-surfaced writing pad. Firm writing pressure results in a series of tiny bumps on the upper surface of the film, easily traced with the fingertips. One of the first attempts to solve this problem was a special wax crayon used in Persia in the 16th century. No one since has been able to duplicate this crayon.

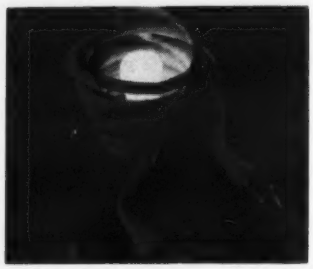
PE ice breaker

Air bubbles, blown through non-corrosive, perforated polyethylene pipe, are being used to bring relatively-warm water to surface of ice-locked slips or ponds, thus melting ice and preventing its re-formation. Pipe, ¾" in diameter, had 1/32" holes spaced every six feet for experiment per-

formed at a Canadian company in melting foot-thick ice. Actually, hole spacing varies with depth of water, and one bubble stream will keep a patch of water open, equal in diameter to depth from which bubbles rise. Air is supplied by compressor on the dock.

Melting in mid air

Levitation melting, developed by Westinghouse Research Laboratories and the University of British Columbia, permits metals and alloys to be prepared for research without



5000°F in 30 seconds, in mid air

danger of chemical reaction from impurities picked up from containing vessels. The secret . . . melting them in mid air. System places compressed metal powder inside cup-shaped copper coil carrying a high-frequency electric current. Eddy currents keep metal powder suspended inside the coil. Temperatures go to 5000°F in half a minute to melt the metal. An inert-gas blanket keeps metal safe from air-borne contamination.

Electronic cop and baby sitter

A compact, electronic alarm and control system can also double as a baby sitter. Unit can be set to react to any movement within a certain area, such as illegal entry, and sound an alarm or issue a warning if the area is dangerous or "hot." In monitoring applications, such as protect-

To page 5

with Dracco *Airstream* Conveyors you can:

handle any dry bulk material . . .

Airstream Conveyors handle hundreds of materials from fine powders to 2-inch lumps: grains, cereals, chemicals, fertilizers, plastics, pulverized rock products. Self-cleaning systems can move two or more materials in quick succession to proper destinations without intermixing.

move it anywhere . . .

Airstream Conveyors move materials **to, through** and **from** production processes. Walls and floors are no obstacles . . . pipelines can be installed out of the way without costly supports and are easily adapted to any new or existing plant layout. Airstream versatility permits bulk material flow in any direction, at any angle and at any desired handling rate.

. . . **with less labor** through elimination of costly manual handling. Most systems require only part-time supervision of one man.

. . . **lower material cost** by permitting bulk-buying. No material is wasted or spoiled from moisture or contamination.

. . . **greater safety** with no hazardous moving mechanical parts and no exposure to toxic materials.

. . . **and cleanliness** since Airstream systems are completely enclosed, dust-free and self-cleaning.

For the profitable answer to your bulk handling problem, call in a Dracco engineer soon. Write or call:

DRACCO DIVISION OF FULLER CO.

4070 East 116th Street • Cleveland 5, Ohio

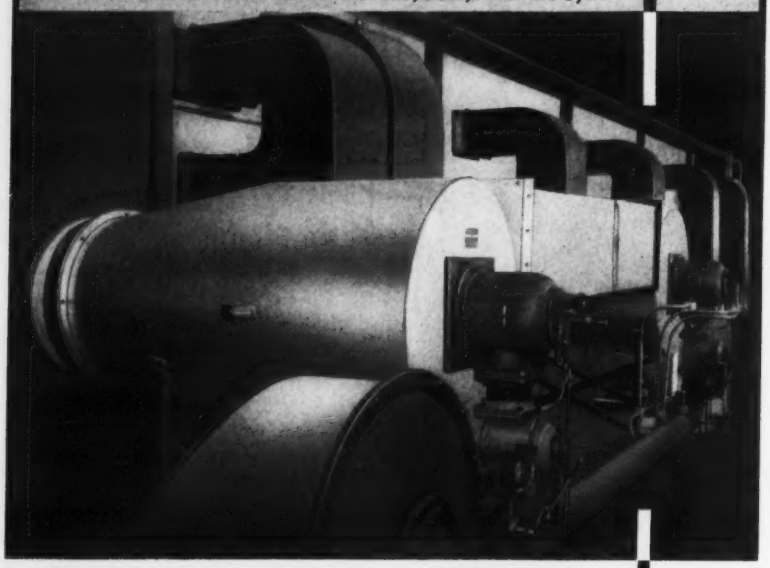
New 32-page brochure presents detailed information on how Dracco Airstream Conveyors have solved bulk materials handling problems. Write for Bulletin 530.

DRACCO *airstream* conveyors
dust control equipment

Check 3327 opposite last page.

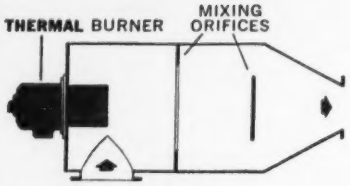
THERMAL'S PACKAGED AIR HEATERS

RATED OUTPUTS TO 20,000,000 BTU/hr



COMPACT...OIL OR GAS FIRED

Extremely versatile design permits the THERMAL Type CA heater to be used in a wide variety of installations and with either gas, oil or combination firing. Shown here is a tunnel dryer installation of the Edgar Plastic Kaolin Co., Edgar, Florida. THERMAL CA air heaters with #7028 burners provide 4,000,000 BTU/hr each using #2 fuel oil. These air heaters are equally adaptable to kilns, ovens, spray dryers and many other installations where products of combustion may be mixed with the air.



NO REFRACTORY REQUIRED

The CA air heater is built around the THERMAL high velocity burner. Because of its unique design, combustion takes place almost entirely within the burner. It normally requires no refractory and provides maximum utilization of available space.

THERMAL'S all-metal, welded construction keeps maintenance costs at a minimum. CA air heaters are supplied as complete "package" installations with outputs ranging from 200,000 BTU/hr to over 20,000,000 BTU/hr at all pressure levels.

WRITE FOR BULLETIN #104

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CHEMICAL PROCESSING

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

For the management team

Vol. 21 February 1958 No. 2

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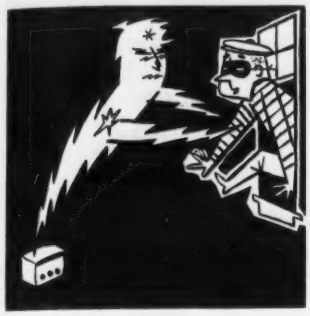
From page 3

ing small children at play out-of-doors, unit signals when there is no activity in a specified area. The alarm will be tripped when the child



"POLICE!"

strays out of the sensor's range. Or it can electronically watch sleeping children and call if they wake and get out of bed or if the room is entered.

Please be seated

Seat-O-Meter, a measuring device for use in the science of tuberology, is now available. Tuberology is the science of fitting chairs to people. The Seat-O-Meter measures correct position of lumbar (spine) peak, required tension for back-support, height and depth of seat, and required position of arm and elbow to working plane. Device is first step in getting to the bottom of the long-standing seating problem of sedentary workers.

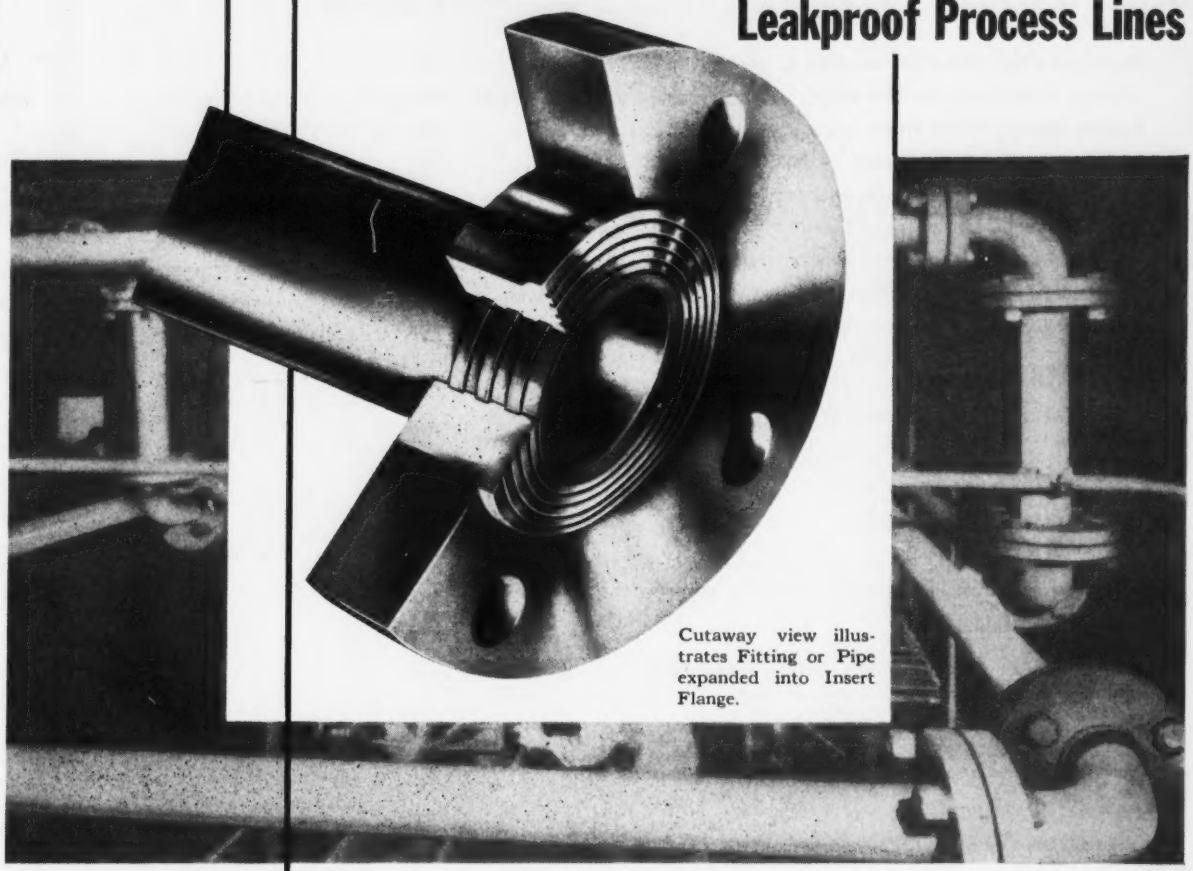
Welding in a bubble

Welding of titanium engine parts for the aircraft industry is being aided by vinyl plastic. Argon-holding welding tents of tough, cast vinyl provide an easy-to-set-up, inert-gas enclosure. Transparent and flexible, it has a very low gas transmission rate. Sleeves with attached gloves are built right in.

More "That's Interesting" items are on pages 105, 152, 186, 230-231.

NOW...FLANGE WITHOUT WELDING

for Faster, Lower Cost Assembly of Leakproof Process Lines



Cutaway view illustrates Fitting or Pipe expanded into Insert Flange.

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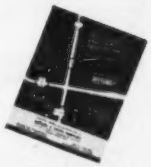
SPEEDLINE IS A REG.T.M. OF HORACE T. POTTS COMPANY

Speedline Insert Flanges provide leakproof joints—*without welding*—and maintain the high quality control standards required for the most complex processes.

"With Speedline Insert Flanges, we have stainless steel bonded to stainless steel, rolled in under pressure for a permanently leakproof installation of transfer and manifold lines", reports Plant Engineer at a Chicago plant.

The "tangential" feature, exclusive with all Speedline formed fittings, allows for direct attachment of Insert Flanges by simple expanding operation.

Learn how the complete line of Speedline corrosion resistant fittings assure piping economy and efficiency not possible with conventional fittings. Write for a copy of "Speedline Catalog" today.



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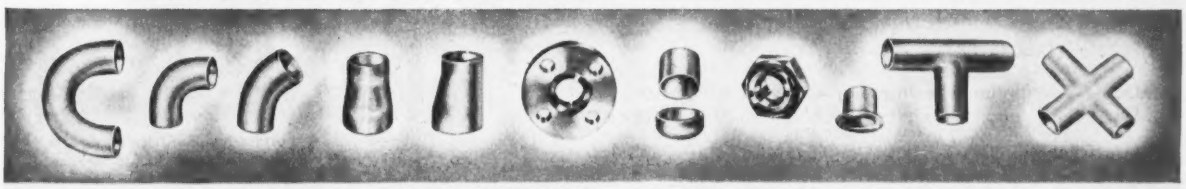

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Check 3329 opposite last page.

chemical processing

highlights

February 1958 volume 21 number 2

Choosing the Right Plant Site — John R. Hoover 27
Customer service Keeps Du Pont on Top 29
Treating Refinery Waste Water 32
Asia: Fast-growing World Market — John E. McKeen 34
Raising the Workingman's Scale of Living — Dr. Willford I. King 38
Are You Getting Credit for Fringe Benefits? — **William H. Smith** 41
Submerged Combustion Prevents Polymer-waste Problem 44
Dry Fluid Drive Eliminates Mixer Breakdowns 47
Pitfalls of Industrial Marketing Research — Dr. Albert D. Freiberg 49

chemical business — trends and what they mean 51

NEW SOLUTIONS OF PROCESSING PROBLEMS

Seal-less pump speeds liquid chlorine loading 140% 65
Plant modernization improves product quality 70

US AND WORLD PETROCHEMICALS

The future looks bright for the petrochemical industry 87
Aluminum reflective insulation cuts costs in polyethylene plants 90

CHEMICAL MATERIALS

Alkyd resin emulsion improves water-thinned paints 103
Molten sulfur filtration aided by cellulose 112

IDEAS

Suspension-type preheater cuts kiln fuel consumption 40% 121

MATERIAL HANDLING

Pneumatic conveyor speeds wood chip handling 132

PACKAGING & SHIPPING

Tailor-made drum linings protect product 145

CORROSION CONTROL

Flexible Teflon hoses beat corrosion 150
Insulation efficiency preserved with asphaltic coating 156

INSTRUMENTATION & CONTROL

Gas chromatography analyzer operates continuously 162
Cake thickness detector "automates" filtration 172

SAFETY

Cardinal rules for scaffolding safety 176

PROCESSING EQUIPMENT

Continuous filter upgrades by-product zinc oxide 182

FOR THE LABORATORY

Liquid scintillation spectrometer simplifies tritium analyses 190
Hazardous locations no big problem for this balance 195

PLANT ENGINEERING & MAINTENANCE

Cut water needs 90% with tantalum condenser 196
Tractor-shovel slashes 80 man-hour job to one hour 202

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THIS MONTH'S COVER

In today's highly competitive chemical business, plant location can be as big a factor in the success of a new venture as the design of the plant itself. On page 27, Goodrich Chemical President John R. Hoover (shown with a model of one unit of the company's Calvert City, Ky., plant) discusses his company's principles of plant location and suggests how a company looking for a new site can avoid some of the most common location problems.

REGULAR FEATURES

That's Interesting 2
Conventions & Exhibits 8
Highlights for Next Month 10
Letters from Readers 12
Nuclear Notes 20
Engineering Data 75
New Literature 210
Advertisers Index 228

SPECIAL READER SERVICES

- For more information on articles and advertisements in this issue, check the Reader Service slip opposite last page
- To subscribe to this magazine, see reader-qualification form opposite last page

over the editor's shoulder

Petrochemicals new CP section

CHEMICAL PROCESSING has carried articles about the growing petrochemical industry for many years. Suggestions from readers, and the increasing scope of the industry, have caused us to feel that we can serve the field still better by a regular, monthly *section* devoted to the problems of the industry. Many consider the petrochemical industry as an industry in itself and think it should be treated as such . . . in a section of its own.

Even those closely associated with the field sometimes do not realize the world-wide, revolutionary aspects of the petrochemical industry.

Not many years ago the word "petrochemical" was not even in the dictionary. Now it is defined in Webster and it gives the hope of better things for all of us. The petrochemical industry enables man to make a high-quality plastic or a fine garment from a barrel of oil or from a gas.

Petrochemicals provide the promise of the future for the petroleum industry. The petrochemical industry means mass production, highly automated plants, precisely ordered molecules, and high-purity products.

In the new section we plan to cover not only engineering developments but also articles which will try to fathom the meaning of the rapidly growing petrochemical industry here and abroad. See US and World PETROCHEMICALS, page 87.

Gordon Weyermuller

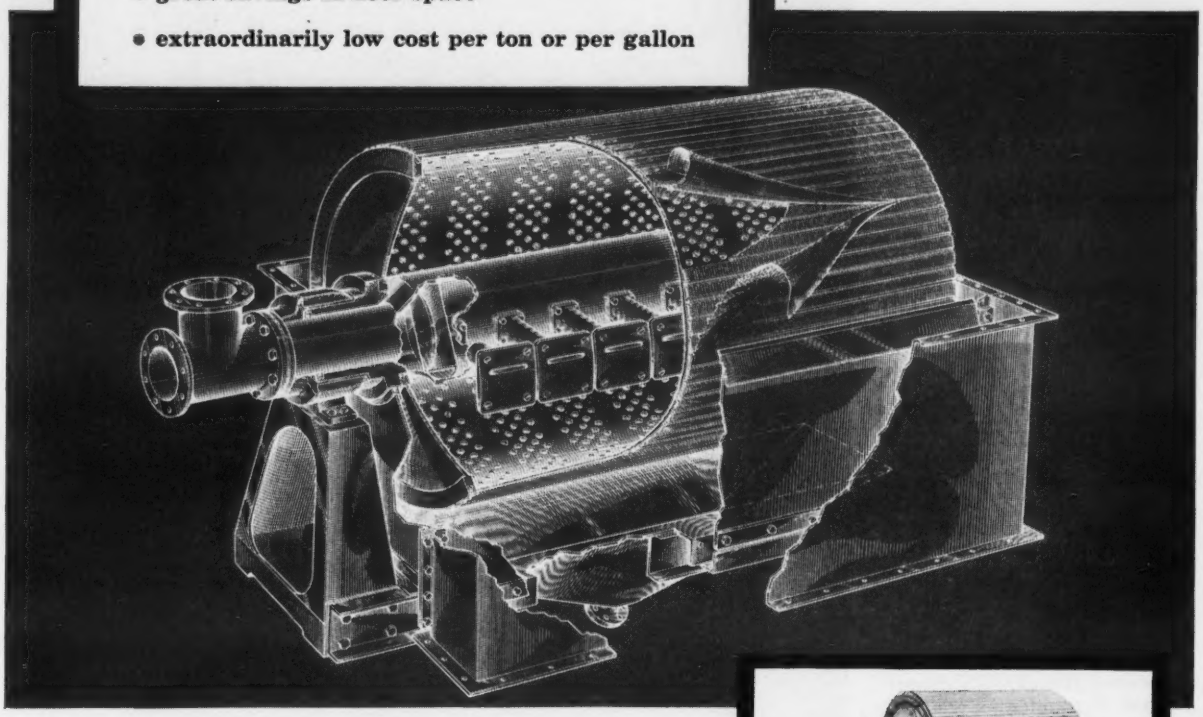
Petrochemical Editor

SEE FOR YOURSELF WHY THIS

BIRD-YOUNG VACUUM FILTER

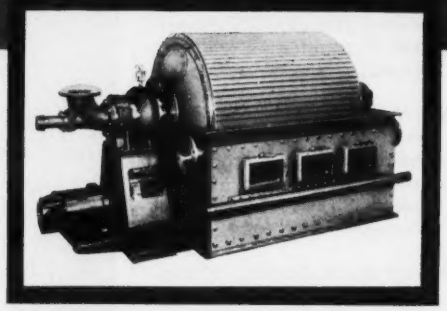
Gives You:

- several times the capacity per foot of filter area
- a drier, better washed cake with sharp separation of wash from filtrate
- great savings in floor space
- extraordinarily low cost per ton or per gallon



A glance inside the drum tells the story:

- No filtrate lines or valves to hinder filtrate flow
- Up to 93% of the multi-compartmented drum surface is under vacuum
- Rapid, uniformly thorough multi-stage counter current wash may be employed
- The drum itself separates air from filtrate
- The slotted shoes or valves employ pulsating, low pressure air for complete cake removal without scrapers or doctors
- On slow filtering materials, thin cake discharge at high drum speed achieves high output plus thorough dewatering
- Units may be totally enclosed and fume-proofed
- A medium size Bird-Young Filter takes up less than 48 sq. ft. of floor space.



NEW BULLETIN gives complete information on many other Bird-Young Filter operating advantages and economies. May we mail you a copy?

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Regional Offices:
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Portland, Oregon

Check 3330 opposite last page.

conventions and exhibits

Meetings and shows of interest to the chemical processing industries

February 4-6. Society of the Plastics Industry, Inc., 13th Annual Technical and Management Conference, Reinforced Plastics Division, Edgewater Beach Hotel, Chicago.

February 12-14. National Association of Corrosion Engineers, Tulsa Section, Ninth Annual Corrosion Short Course for Pipeliners, Mayo Hotel, Tulsa, Okla.

February 16-20. American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc., national convention, Hotel Statler, New York.

February 17-20. Technical Association of the Pulp and Paper Industry, annual meeting, Hotel Commodore, New York.

March 17-21. International Atomic Exposition, Inc., International Amphitheatre, Chicago.

March 17-21. National Association of Corrosion Engineers, Annual Conference and Exposition, Civic Auditorium, San Francisco.

March 26-28. American Power Conference, 20th anniversary meeting, sponsored by Illinois Institute of Technology, Hotel Sherman, Chicago.

March 26-28. Society of Plastics Industry, Inc., Pacific Coast Section, Annual Conference Meeting, El Mirador Hotel, Palm Springs, California.

April 1-3. The American Society of Mechanical Engineers, Conference of ASME Division of Instruments & Regulators, University of Delaware, Newark, Delaware.

April 13-17. Third Pacific Chemical Exposition, sponsored by The California

Trial by fire

DUCTILE IRON VALVES ARE THE LATEST ADVANCE IN WALWORTH'S CONTINUING RESEARCH AND DEVELOPMENT PROGRAM

This fiery demonstration is dramatic proof of Walworth's constant effort to develop better valves. This use of ductile iron — "the cast iron that can be twisted and bent" — results in new Walworth Valves that are stronger than gray cast iron valves and several times tougher. Ductile iron combines the corrosion resistance of gray iron and the strength of steel. Ductile iron valves have many times greater corrosion resistance than more expensive steel valves.

In service these Walworth Ductile Iron Valves will solve many of the corrosion, cost and maintenance problems for the marine, petroleum, gas, and chemical industries. Ductile iron studies are just a part of the continuing work of Walworth's Research and Product Development Division.

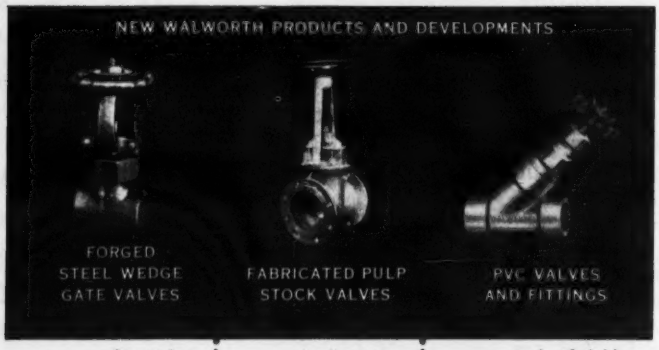
For almost every piping job there is a Walworth Valve . . . in a type, size, and material to meet your requirements . . . Gate, Globe, Angle, Check, and Lubricated Plug Valves in a variety of pressure ratings. For more information contact your local Walworth Distributor.

WALWORTH SUBSIDIARIES: ALLOY STEEL PRODUCTS CO. • CONOFLOW CORPORATION • GROVE VALVE AND REGULATOR CO.

In the first stage of thermal shock test, oil fire and gas flame heat a 6-inch Walworth Gate Valve constructed of ductile iron to a red hot temperature of 1350°F.

Now the Walworth Valve is quickly chilled with streams of water. A cast iron valve could shatter under such a drastic and rapid change in temperature.

Slightly scorched, the valve keeps its shape and dimensions despite the ordeal and is completely operable. The test proved that, under these conditions, Walworth ductile iron valves have a thermal shock resistance equal to that of more expensive steel valves.


NEW WALWORTH PRODUCTS AND DEVELOPMENTS
FORGED STEEL WEDGE GATE VALVES
FABRICATED PULP STOCK VALVES
PVC VALVES AND FITTINGS

. . . for water, steam, gas, and air service to 850°F. Oil or oil vapor to 1000°F. OS & Y types. Screwed or socket welding ends. Bolted or union bonnets. Sizes from ¼ to 2 inches.

. . . for lines carrying pulp stock in varying concentrations, slurries, and other fibrous materials in suspension. All-welded stainless steel construction. Corrosion resistant. Sizes from 3 to 30 inches.

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Check 3331 opposite last page.

Section, American Chemical Society, Civic Center Exhibit Hall, San Francisco.

April 13-18. American Chemical Society, 133rd national meeting, Civic Center Exhibit Hall, San Francisco.

April 15-17. American Welding Society, annual Welding Show, Kiel Auditorium, St. Louis.

April 20-23. American Institute of Chemical Engineers, Sheraton-Mt. Royal Hotel, Montreal, Canada.

April 21-23. American Oil Chemists' Society, spring meeting, Peabody Hotel, Memphis.

April 27-*May* 1. The Electrochemical Society, Inc., Statler Hotel, New York.

May 1-8. American Society of Tool Engineers, 26th Annual Meeting and Tool Show, Philadelphia Convention Center, Philadelphia.

May 8-10. Western Material Handling Show, Great Western Exhibit Center, Los Angeles.

May 11-14. Fluid Controls Institute, Lake Placid Club, Lake Placid, New York.

May 19-23. National Fire Protection Association, annual meeting, Palmer House, Chicago.

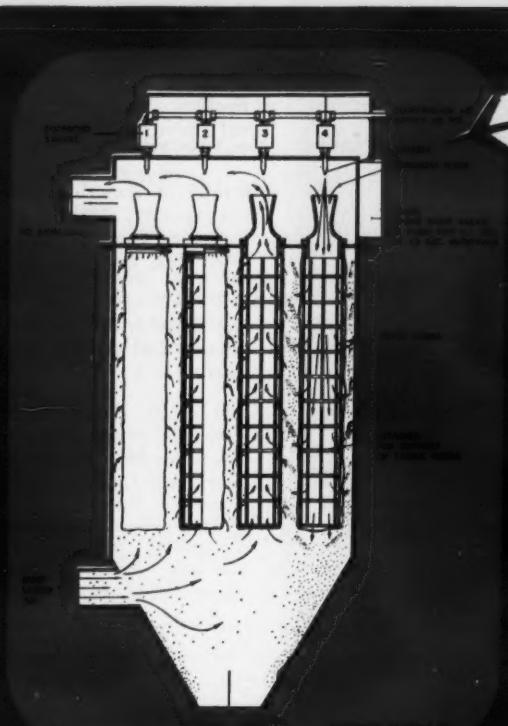
June 9-11. American Association of Spectrographers, Ninth Annual Symposium on Spectroscopy, Pick-Congress Hotel, Chicago.

June 9-12. National Materials Handling Exposition, Public Auditorium, Cleveland.

June 9-13. Fourth International Automation Congress and Exposition, Coliseum, New York.

June 22-27. American Institute of Chemical Engineers, 50th Anniversary Meeting, Bellevue-Stratford Hotel, Philadelphia.

September 9-12. Tenth National Chemical Exposition, International Amphitheatre, Chicago.



JET-ACTION does the job!

CONTINUOUS, AUTOMATIC SELF-CLEANING!

NO MAINTENANCE DOWN TIME!

ASK THE MIKRO-MAN TO CALL!

We'll arrange a working demonstration of the MIKRO-PULSAIRE Model Unit right in your own plant or office . . . working on your own materials. Write for details.

the

MIKRO-PULSAIRE* COLLECTOR

Successful processing operations demand around-the-clock dust collection and full-time automatic cleaning . . . with no interruptions for maintenance. Jet-action MIKRO-PULSAIRE answers these requirements . . . does a better job at less cost. There are no internal moving parts to cause tie-ups . . . extra-long filter media life is assured . . . and MIKRO-PULSAIRE shows a performance-proven filtering efficiency of 99.9% *plus!* Bulletin 52A gives full facts and figures. It's yours for the asking.

For additional product information and location of the MIKRO-MAN nearest you, see Chemical Engineering Catalog for 1958, pgs. 1467 to 1474.

A COMPLETE LINE OF UNITS FOR ALL COLLECTION JOBS, FEATURING:

- Continuous, automatic cleaning
- Ease and simplicity of maintenance
- No internal moving parts
- No shaking or frictional action on filter
- Efficiency 99.9%+

Mikro-D

PULVERIZING MACHINERY DIVISION
METALS DISINTEGRATING COMPANY, INC.
60 Chatham Rd., Summit, New Jersey

GENUINE MIKRO-D REPLACEMENT PARTS AVAILABLE FROM LARGE STOCK WITHIN 48 HOURS

Check 3332 opposite last page.

looking ahead to next month

A new tax plan

The constant struggle of management to find new sources of capital might well be eased if the new corporate income tax plan proposed by D. S. Moffitt, v-p of the Connecticut Hard Rubber Company, is adopted. Plan suggests a method of making more expansion funds available while not affecting government revenue over the long range.

You'll find Mr. Moffitt's thought-provoking suggestions in the March issue of CHEMICAL PROCESSING.

March issue to feature material handling in chemical plants

Long recognized as the best phase of your operation for cost reductions, material handling in the chemical processing industries continues to grow in importance.

In the March issue, CHEMICAL PROCESSING will feature material handling and its role in the chemical processing industries. Highlight of this feature will be a round-up discussion by top men in both the material handling and chemical processing fields.

The most important types of material handling equipment used by the chemical fields will be discussed by the men who know this equipment best. These are the engineers who are familiar with chemical processing problems and who have worked to develop means for solving them.

But there is more to the story than just the use of equipment in the plant. Now that more attention is being given to design, purchasing, and operation of this equipment, these aspects must be discussed too.

Chemical processing people representing such areas as top management, plant management, engineering, finance, and purchasing will review their roles and functions as they pertain to material han-

... Quick previews of some highlights in March Chemical Processing

dling operations in the chemical processing company.

The feature will also include a number of case history stories where companies have realized savings or have increased safety with improved material handling procedures.

Fluidized packing set-up accounts for big savings

Great Lakes Carbon's Dicalite Department in Walteria, Calif., had been incurring high maintenance costs on packaging diatomaceous earth in bags. Switch to fluidized packing equipment accounted for a savings of $5000 to $7000 per year in maintenance alone. But other savings — and in pretty large amounts — were also realized.

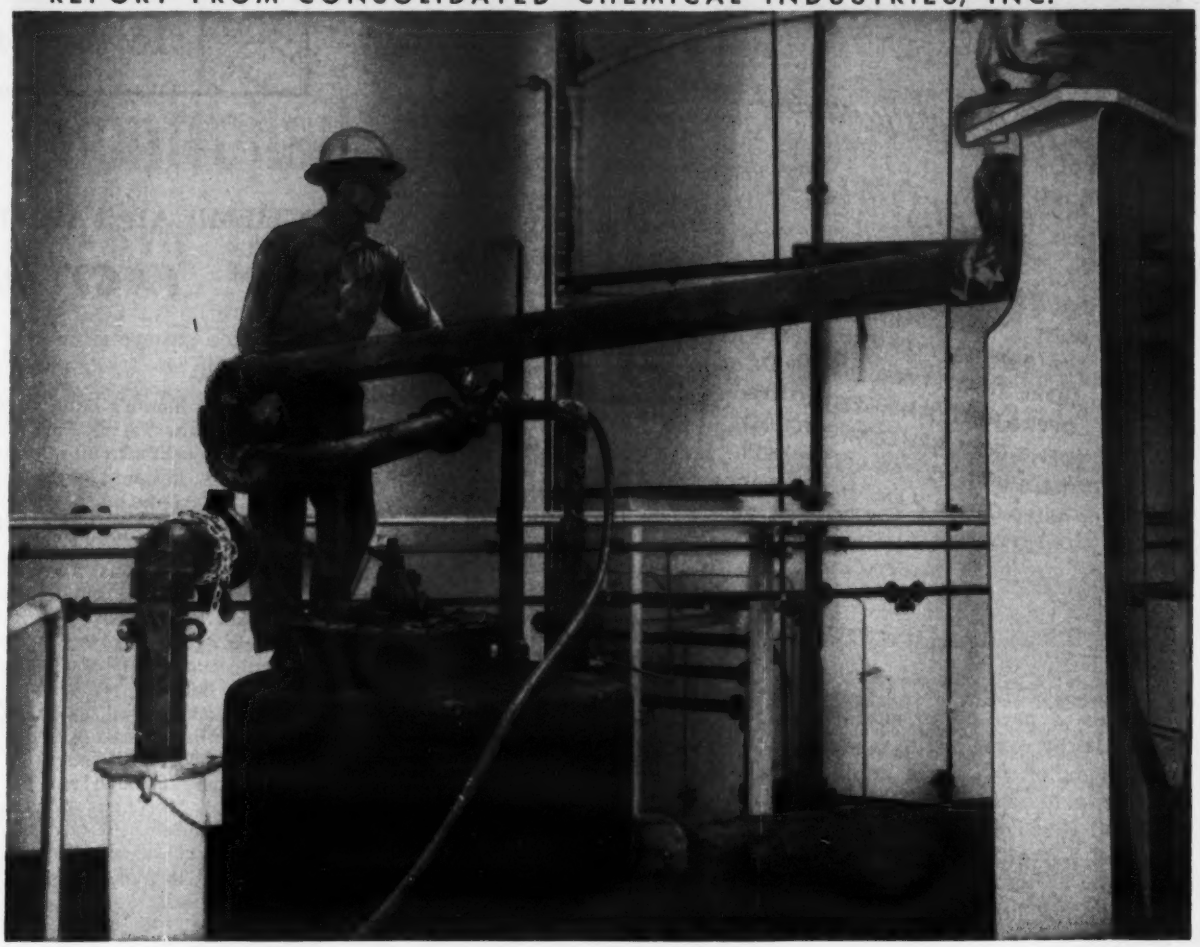
In next month's Packaging and Shipping section you will read how Great Lakes Carbon has been able to realize large man-hour savings in their packaging operations to cut losses from spillage, and to get better accuracies in filling.

All-electronic plant is fully controlled ... yet versatile

Toll refining at Truland Chemical Company means exact yields must be secured in distilling customer's products. However, almost every lot put through Truland's stills is a different material, which means operating parameters must be constantly changed. Truland does it with ease ... with an all-electronic plant.

Assistant Editor Bill Clarke interviewed Dr. Daniel Friedland, vice president of Truland Chemical Company at East Rutherford, New Jersey, to learn more about the problems of running the plant. The report, based on over a year's experience with the new operation, leads off March's Instrumentation and Control section.

REPORT FROM CONSOLIDATED CHEMICAL INDUSTRIES, INC.

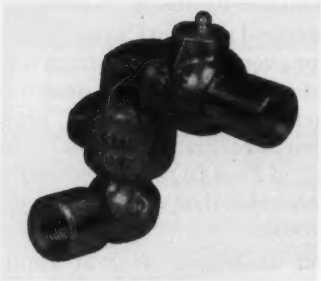


Give your product a SAFE SENDOFF

Use CHIKSAN LOADING ARMS

Consolidated Chemical Industries is safety conscious! They use Chiksan loading arms for tank car loading of sulphuric acid.

To assure complete safety in your loading operations, CHIKSAN manufactures loading arms and ball bearing swivel joints from the same materials used in the piping systems. Steel, malleable iron, nickel-bronze, stainless steel and special alloys are used ... meeting most chemical requirements. CHIKSAN ball-bearing swivel joints speed the loading and unloading of both liquids and gases ... safely. Send for your copy of our free catalog which shows complete CHIKSAN lines and standard loading arm designs.



Chiksan Swivel Joints rotate 360° in 1, 2 and 3 planes, handling air, hydraulics, fuels, oils, water and other fluids.

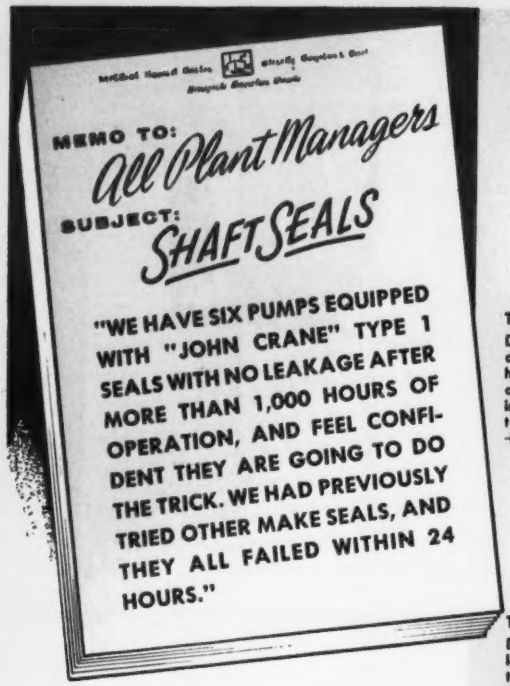
WRITE DEPT. 172 FOR CATALOG

CHIKSAN

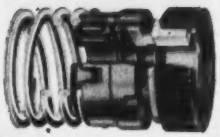
A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION fmc

CHIKSAN COMPANY, Brea, California • Chicago 3, Illinois • Newark 2, New Jersey • Well Equipment Mfg. Corp., (Division) Houston 7, Texas • Chiksan Export Co., Brea, California; Newark 2, New Jersey • Chiksan of Canada, Ltd., Edmonton, Alta.

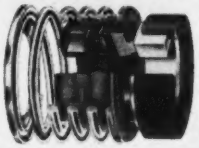
Check 3333 opposite last page.


MEMO TO:
All Plant Managers
SUBJECT:
SHAFT SEALS
"WE HAVE SIX PUMPS EQUIPPED WITH "JOHN CRANE" TYPE 1 SEALS WITH NO LEAKAGE AFTER MORE THAN 1,000 HOURS OF OPERATION, AND FEEL CONFIDENT THEY ARE GOING TO DO THE TRICK. WE HAD PREVIOUSLY TRIED OTHER MAKE SEALS, AND THEY ALL FAILED WITHIN 24 HOURS."

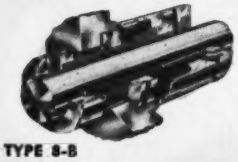
John Crane



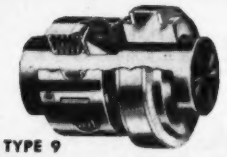
TYPE 1
Designed for limited stuffing box diameter. Handles water, light hydrocarbons, refrigerants, mild acids and other liquids non-injurious to synthetic rubber at temperatures from −40°F. to +212°F., pressures to 200 psi.



TYPE 2
Designed for limited stuffing box length. Handles same services, temperatures and pressures as Type 1.



TYPE 8-B
Heavy duty, high pressures. Packaged construction for easy installation. Handles pressures to 1200 psi., temperatures from −40°F. to +250°F. Services same as Type 1.



TYPE 9
Famous as a problem solver. Sealing members of chemically inert Du Pont Teflon. Engineered to service conditions to handle practically all destructive acids, corrosives and gases at temperatures from −120°F. to +500°F., pressures to 150 psi. Available in balanced construction for pressures to 750 psi.

This is part of an actual memo sent by one plant manager to others of the same company in different sections of the country—and that company is now exclusively specifying these and other type "John Crane" Shaft Seals for *all* their liquid handling requirements.

You too can save time, trouble and expense by doing likewise.

You'll find a "John Crane" Shaft Seal for every service . . . from hot or cold water to the most destructive acids and corrosives . . . high temperatures, high pressures . . . in types and sizes to meet practically any mechanical or dimensional requirement.

Send us details on your application. We'll recommend the proper shaft seal. Request Bulletin S-204-3 for complete overall information.

Crane Packing Co., 6421 Oakton St., Morton Grove, Illinois, (Chicago Suburb).

In Canada: Crane Packing Company, Ltd., Hamilton, Ont.

Check 3334 opposite last page.

letters from readers

CHEMICAL TARIFFS —

FACT OR FANCY?

Gentlemen:

In last month's issue, J. T. Miller, in a letter to the editor entitled "Low Tariffs Favor US", offered some rebuttal to my article on tariffs in the August issue of CHEMICAL PROCESSING (page 30). His first point deals with the dollar gap. This involves international balance of payments — a very complicated subject. Let us see if we can clarify it.

In contrast to what Mr. Miller supposes, it is not necessary or even desirable that exports equal imports for any given country. What ideally should balance is the exchange value of all goods and *services*. In our case, in addition to imports, foreigners obtain dollars through our foreign aid, through offshore military purchases, tourist spending, gifts from US relatives, shipping services, and foreign investments.

When all of these latter, which total many billions of dollars annually, are taken into account, foreign claims on US dollars have been increasing steadily by $1½ to $2 billion per year. The temporary reversal last spring was the result of the Suez closing. The fact that some nations by unsound fiscal policies run short of all hard currencies, including dollars, is nothing that we can control.

When enumerating strong currencies, Mr. Miller should have added the Swiss franc and the Canadian dollar to that of the US dollar and the German mark. All of these are in short supply throughout the world. This is just one more example of Gresham's law — a tendency for everyone to want sound money in preference to cheap, inflated money.

Mr. Miller's second point on national defense hinges on two erroneous assumptions. The first implies that our allies can have foreign trade only by trading with us. The Europeans themselves realize that with the European Common Market they will trade more freely with each other and be less interested in trade with us. The second assumption is that of ascribing to anyone who wants any fair tariff as being against trade. Nowhere in my discussion did I suggest elimination of our foreign trade.

In his third point, Mr. Miller assumes that automated industries like the chemical industry and the auto industry can produce more cheaply than anyone else in spite of our high labor rates. What are the facts? Does anyone think that the identical plant built in Europe, let us say, where the capital cost would be about half what it would be here and where labor to run it costs roughly ¼, will turn out product costing more per unit than in this country? Does Mr. Miller subscribe to a belief that we are so superior that only we can master modern technology? A dead dog orbiting our earth has dispelled this belief in the minds of most Americans.

The facts are that the Volkswagen Company actually bought a plant in New Jersey and planned to manufacture their car in this country. When they got the full cost facts they sold their US plant, retreated to and expanded in Germany. Today the two largest US auto producers are importing cars from their foreign plants. In the chemical industry, the Italians are supplying, among other chemicals, mil-

lions of pounds of trichloroethylene to the US market. This is one of those low-cost "mass produced" petrochemicals in the production of which the US industry is supposed to be impregnable — supposed by the free traders.

Facts, in contrast to "ivory-tower" theory, show that even our most automated industries are vulnerable whenever foreign producers, who pay wages well below our legal minimum wage of $1.00 per hour, have adequate markets to justify mass production. With mass production their efficiency will not differ greatly from ours and the per unit costs will be below ours because of their low wages.

DR. L. E. LLOYD
Economist
The Dow Chemical Company

Ideas On 'Creativity' and 'Manpower'

Dear Editor:

Two challenging articles are in the December issue of CHEMICAL PROCESSING: "Creativity and Survival" (page 27) and "Begin Solving The Manpower Shortage Now" (page 25). Isn't there a relationship between these two thoughts?

Any engineer living on the West Coast in the Los Angeles area today is aware of one thing. What has happened to the surplus of jobs or shortage of trained personnel? In a very short period of about six months the shortage has become a surplus and we hear various stories of experienced technical people searching for jobs. And that means jobs and not positions. The constructors have run out of work and they are tightening their belts. Some companies are reorganizing and perhaps finding that some of this necessary paper work was after all just "paper work."

Before we rush to encourage young people to become engineers let's examine what talents are really needed and demonstrate that they are to be in short supply. Let's see if it is economically advisable to spend thousands of dollars and four years or more of a

To page 17

Controlled dispersion for better blends

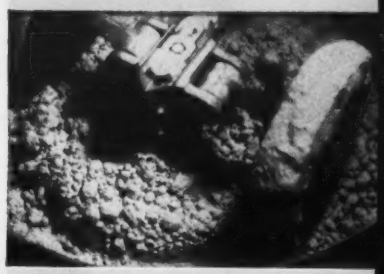
If you're coating a fine, dry material; blending liquids into a dry powder . . . or dispersing a small amount of one material into another you need more than a simple stirring, tumbling or agitating action to achieve the desired results.

In the Simpson Mix-Muller a *three-way* kneading, smearing, spatulate action actually coats one material with another—rather than placing them *next* to each other. Agglomerates are broken up, moisture or binder dispersion is thorough. You get an intensive, homogenous mix that *stays* mixed and will not segregate in storage or transit. Want proof? Write for details on a confidential test. See what *mulling* can do and remember . . .

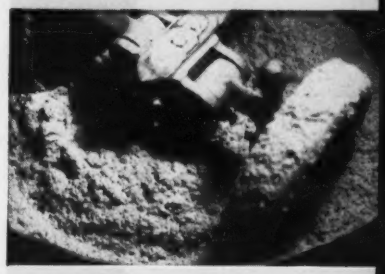
MIXING IS OUR BUSINESS

SIMPSON *MIX-MULLER*® DIVISION
National Engineering Company
640 Machinery Hall Building • Chicago, Illinois

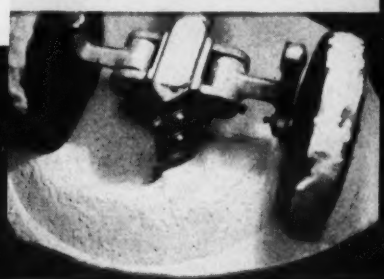
3 WAY ACTION saves time and reprocessing



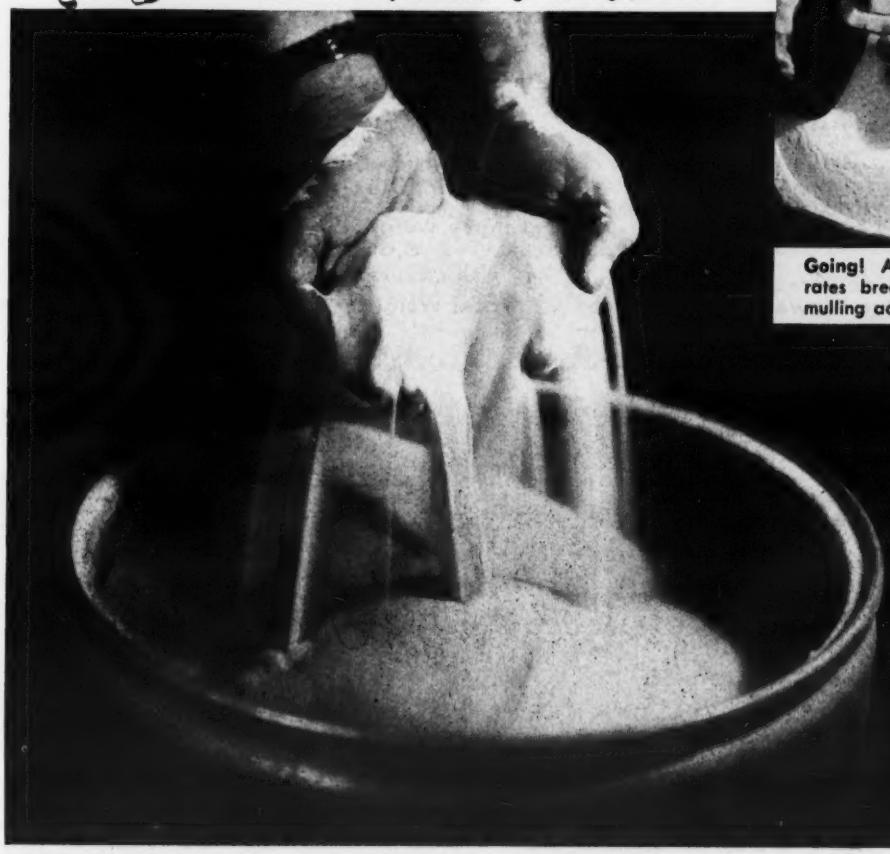
Mix is wetted; dispersion of coating media begins.



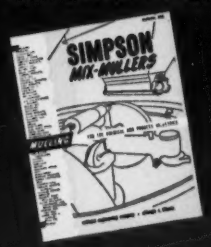
As mulling proceeds, mix begins to "lump" up as moisture is dissipated.



Going! As material drys agglomerates break down under intensive mulling action.



◀ **Gone!** Components are thoroughly blended. Mix is uniform, smooth flowing . . . quickly achieved.



WRITE FOR Bulletin on *Mulling for the Chemical and Process Industry.*

Check 3335 opposite last page.

Empty weight on rear axle
9,020 lbs.

4-wheel-drive, rear-wheel
power-steer

Full power-shift in all speeds
plus forward and reverse

Empty weight on front axle
6,660 lbs.

Total weight—15,680 lbs.

11,000 lbs. break-out force

5,000 lbs. carrying capacity

Powerful high-torque Case gasoline or diesel engine, equipped with power-boosting torque-converter drive, gives the Case W-9 Terra-load'r up to *40,000 lbs.** of crowding power for fast digging in hard materials. Direct thrust design utilizes full power and prying action of machine for maximum digging efficiency. Operator always has clear view of bucket.

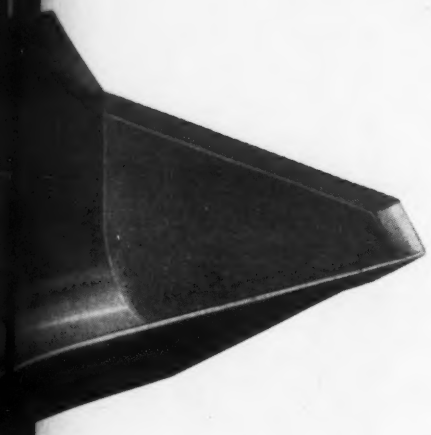
*Assuming adequate traction

40° bucket rollback, combined with properly balanced weight distribution, enables the Case W-9 to carry bigger payloads at higher speeds —with less spillage— and without the usual "bounce and forward-dip" experienced with conventional rubber-tired loaders. Full power steering on rear wheels makes unit extremely easy to turn and maneuver.

Short, rigid lift-arms, pivoted *ahead* of the operator, provide 62½" of forward reach for pitching loads into center of truck. This exclusive feature also gives operator unobstructed visibility on both sides . . . eliminates danger of catching operator's arm in lifting mechanism . . . makes it easy to get on or off machine any time, without climbing over boom arms.

NEW CASE W-9 TERRALOAD'R

revolutionizes loader performance on rubber ...saves you up to $2000 in first cost!



Here, at last, is a big capacity *4-wheel drive, rear-wheel-steer* loader that gives you all the advanced performance features you've been wanting in this type of unit — at savings *up to $2000 in first cost.* With the new W-9 Terraload'r you get . . .

Better balance and stability — Improved weight distribution, with 37% more empty weight on rear wheels, provides better traction for tough digging, without "bucking", or raising rear wheels off ground. This, together with better lateral stability, enables you to dig, maneuver and dump heaping payloads faster, easier, more safely.

Improved operator safety — Operator has unobstructed visibility in all directions . . . can get on or off machine in a hurry. And all boom-lifting mechanisms are completely out of the way!

Power matched to the job — High-torque Case gasoline engine (or famous all-weather-starting Case diesel), with torque-converter drive, insures adequate power for all digging and loading operations — with *maximum* fuel economy, dependability and long life.

Constant-mesh power-shift transmission — Provides three forward and reverse speed ranges — from 0 to 21 MPH — automatically balanced to changing loads, with full power-shift on-the-go in all speed ranges, as well as forward and reverse. Two conveniently located levers — one for speed selection, one for forward and reverse — give instant, positive control without mechanical shifting.

One warranty, one service source — Complete machine — *including the engine* — is engineered, built and fully warranted by J. I. Case Company, and serviced by reliable Case Industrial Dealers everywhere. No costly delays on parts! No "split-responsibility" on service!

Investigate today — Call or write your nearest Case Industrial Dealer for full information, including details of new Case financing and LEASE plans to fit your needs, without tying up needed working capital.

3 Bucket Sizes

1⅜ cu. yd.—for tough digging
1¾ cu. yd.—for std. materials
2¾ cu. yd.—for light materials

Clip...mail for free literature

J. I. CASE COMPANY
Dept. B1548, Racine, Wis., U.S.A.

☐ Send free catalog on new W-9 Terraload'r
☐ Send name of nearest Case Industrial Dealer

Name ..... Title.....
Employed by .....
Address .....
City ..... State.....
C-TL-139

For more information on product at left, specify 3336 see information request blank opposite last page.

Big 42.5 GPM hydraulic pump teams with husky double-acting lift and bucket-tilt cylinders to give the Case W-9 Terraload'r a terrific break-out force of 11,000 lbs. at ground level. Carrying capacity in travel position is 5,000 lbs. All-weather cab (shown in above illustration), together with heater and other deluxe accessories, are optional at extra cost.

Wide, flat-bottom Case bucket gets heaped loads fast . . . raises to full lift-height in 7½ seconds. Automatic sight-leveling gauge on right bucket tilt-cylinder tells bucket-angle at a glance, enables operator to adjust bucket to ground level position while lowering. Transmission is automatically disengaged by touching brake, for max. hydraulic power.

CASE

1st in quality for over 100 years

TEVA* revealed that SNAP*ON pipe insulation would save $10,140!

- **an initial saving of $10,140 on 15,000 ft. of pipe insulating material!**
- **an annual operating saving of $1836!**

. . . these were some of the reasons why one-piece Snap*On glass fiber pipe insulation was recently selected for the process lines of a huge new industrial plant. Method used to compare various insulations was TEVA (Thermo-Economic Value Analysis).* TEVA findings showed that 1½" Snap*On was *thermally more efficient* than 2" of the compared insulation, and thus $10,140 could be saved on material alone. Application savings, based on actual time studies, were estimated at 15%-20%. Operating savings of 3.6 billion Btu/year were calculated to result in an additional annual saving of $1836.

***TEVA (THERMO-ECONOMIC VALUE ANALYSIS) IS AN EXCLUSIVE G-B SERVICE, YOURS FOR THE ASKING. FOR TEVA SERVICE, CALL YOUR LOCAL G-B DISTRIBUTOR (LISTED IN ADJOINING COLUMN)**

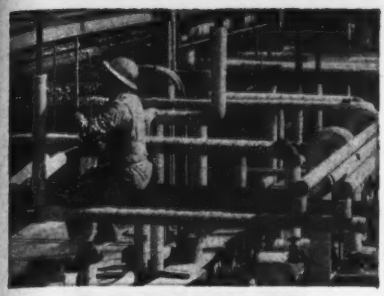
GUSTIN-BACON

Manufacturing Company GUSTIN gb BACON

Thermal and acoustical glass fiber insulations • Pipe coupling and fittings
Molded glass fiber pipe insulation

254 W. 10th St., Kansas City, Mo.

For more information on product at right, specify 3337 see information request blank opposite last page.



G-B SNAP* ON DISTRIBUTORS
(See ad on facing page)

ALBUQUERQUE, Mt. States Insulation Co.
AMARILLO, Ball Distributing & Engr. Co.
ATLANTA, Ga., Reynolds Aluminum Supply Co.
BALTIMORE, Md., Leroy Insulation Co.
BILLINGS, Mont., Big Horn Supply, Inc.
BIRMINGHAM, Ala., Shook & Fletcher Supply
Reynolds Aluminum Supply Co.
BROOKLINE, Mass., Homans-Kohler, Inc.
BUFFALO, Industrial Insulation Sales, Inc.
CHARLESTON, W. Va., Baldwin Asbestos Products Co.
CHARLESTON HEIGHTS, S. C., Stafford Insulation Co.
CHARLOTTE, N. C., Guy M. Beaty & Co.
CHATTANOOGA, Guy M. Beaty & Co.
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INDIANAPOLIS, Central Supply Co.
JACKSON, Miss., Paine Refrigeration & Supply Co.
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MOBILE, Ala., Shook & Fletcher, Inc.
NASHVILLE, Reynolds Aluminum Supply Co.
NEWARK, N. J., Eastern Steam Specialty Co.
NEW HAVEN, Conn., Insulation Supply Co.
NEW ORLEANS, Eagle Asbestos & Packing
NEW YORK, Eastern Steam Specialty Co.
OKLAHOMA CITY, Ball Distributing & Engineering Co.
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PHILADELPHIA, John F. Scanlan, Inc.
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PHOENIX, Ariz., Kircher Asbestos & Rubber Co.
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ROCKFORD, Ill., Mott Brothers Co.
SALT LAKE CITY, Bullough Asbestos Supply Co.
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SAN DIEGO. Western Fibrous Glass Products
SAN FRANCISCO, Western Fibrous Glass Products
SAVANNAH, Ga., Reynolds Aluminum Supply Co.
SEATTLE, Western Fibrous Glass Products
SOMERVILLE, Mass., Thermal Insulation Co.
SOUTH BELOIT, Ill., Mott Brothers Co.
ST. LOUIS, The Brauer Supply Co.
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ST. PAUL, Asbestos Products, Inc.
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GUSTIN gb BACON

From page 13

young person's resources in order that he may become an engineer. Some phases of our technical branches are in short supply, to judge from the advertisements for electronic technicians and engineers. But there are many fields which are short only from the standpoint of engineers willing to work at a given salary level.

Let's encourage real creativity where it can best be developed, in schools and in research. Let's also tell the youth the truth. This engineering is just like any other means to a livelihood. It isn't very likely you'll build bridges or become a millionaire.

MILTON A. BUFFINGTON
San Gabriel, California

Reader Buffington is right. Since the Government's "stretchout" in the aircraft industry, West Coast engineers have indeed been more plentiful and it's generally conceded that the immediate shortage of engineers in most fields has eased somewhat in the last few months. Yet it's also conceded that the number of students headed toward the scientific fields now falls far short of the projected demands for fifteen, ten, or even five years from now.

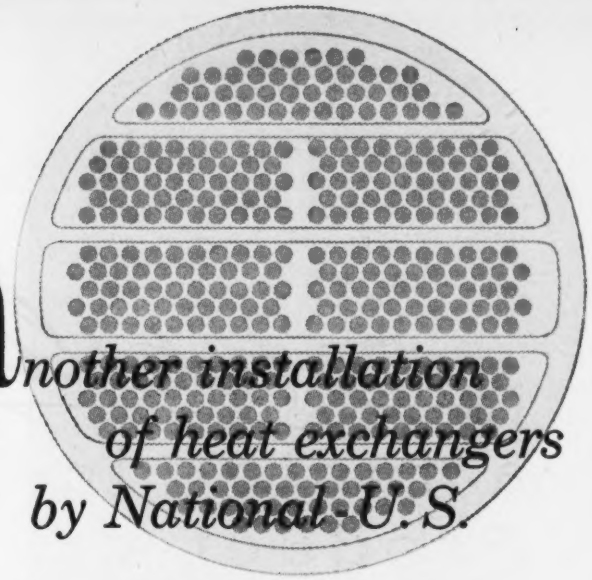
— ED

Dear Editor:

This is to express an appreciation for your presentation of the timely and stimulating article, "Creativity and Survival," and to offer some brief comments on it.

Dr. Martin's article comes at a most opportune time for our country, and contains a most opportune message. While over the past few years Americans have been repeatedly warned, and most stridently warned over the past few weeks, that Russia is producing more and better trained scientists than are emerging from American colleges and universities, this article adds a warning to show that creativity is also a function of survival.

Today, with Sputniks I & II



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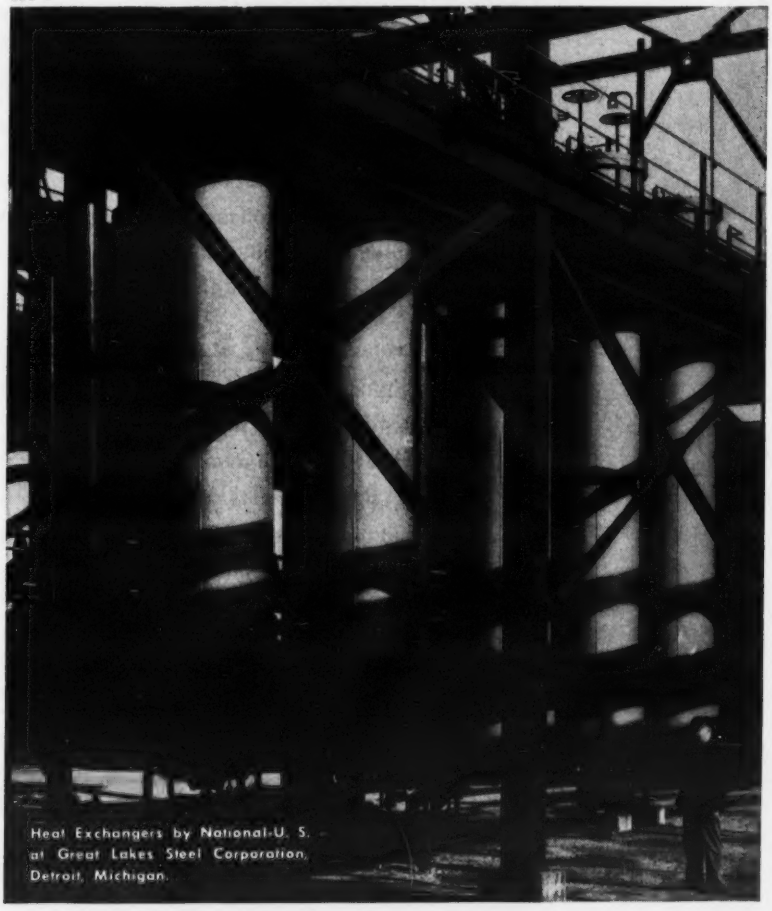
Heat Exchangers by National-U. S. at Great Lakes Steel Corporation, Detroit, Michigan.

Check 3338 opposite last page.

is *Sterilization* a factor in your Product or Process?

Because much of the initial research on gas (ethylene oxide) sterilization originated at American Sterilizer, growing numbers of AMSCO-developed installations have been serving production and processing industries for more than eight years.

Here, as in the traditional Pressure Steam or Dry Heat methods, the American Sterilizer Company offers the world's largest accumulation of facilities, experience and research data on the broad subject of sterilization.

We have a complete range of techniques and automatically controlled equipment for standard or special installations . . . for laboratory, pilot plant or production application. Experimental and pilot plant facilities are available through our Research Department . . . and engineers of our Scientific Division are "on call" for consultation on such matters as production processes, techniques or packaging materials related to sterilization.

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SCIENTIFIC DIVISION

AMERICAN STERILIZER

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Check 3339 opposite last page.

LETTERS

circling the globe while our own "moon" rests supinely at Cape Canaveral, we are facing up to a resolution to produce more, more, more scientists and mathematicians with more, more, more training. In our "all shook up" condition, possibly a greater need than an expansion in technical training can be clearly seen.

JOHN E. WISDOM
Joliet, Ill.

Dear Sir:

I have just received the December issue of CHEMICAL PROCESSING. This issue has many excellent articles, including the one on solving the manpower shortage, creativity and rare earths.

From my point of view, you certainly are maintaining a high standard in these most recent issues.

WILLIAM F. MITCHELL
General Manager
General Mills, Inc.
Chemical Division

Dear Sir:

For ten years, I've been reading in newspapers and magazines about scientists and teacher shortages. I believe accuracy demands that the shortages should be expressed in terms of income levels. I believe that it would then be apparent that the supply of these people is meeting demand in a classic manner for a free competitive economy. As a matter of fact, as a result of the shortage propaganda, *Fortune* magazine recently had an article in which industry has reported that the engineer shortage has disappeared. Increased supply of technical people has resulted from the propaganda, and I suspect that the requirements for draftsmen and test tube washers are now being better met. It is no secret that salaries and type of work done has been a source of irritation among science graduates.

I work quite long hours as an engineer, and additional time is required in keeping

up to date through technical periodicals. I do manage to read some newspapers and other periodicals. On the basis of the information I've been able to acquire, I can't buy the statements that we have a technical manpower shortage. I don't believe the government should plan this phase of our economy any more than any other phase. I believe in a competitive economy. I believe that the law of supply and demand will solve any shortage that may exist or that may develop.

A READER

Gentlemen:

Dr. Martin's article, "Creativity and Survival," is splendid and timely. To its conclusion, I can only say "Amen."

WOLFGANG HUBER, PHD
San Francisco, California

Gentlemen:

It is a long time since I have seen anything in print of the quality, depth, and hard realism of this contribution by Dr. Gustav J. Martin. You are to be congratulated for its publication.

The whole thing is magnificent and terribly needed. I have been an industrial chemist since 1917 and so have had a long time in which to observe trends in science and industry. The emphasis today is on administration rather than creation, the swivel chair rather than the laboratory stool. We give lip service to the latter, but our *hearts* aren't there and this is what counts.

Dr. Martin will be savagely attacked, but not for what he actually said; all sorts of irrelevant targets will be set up and demolished; his real argument is unhappily irrefutable. And I don't know what can be done about it except through suffering.

G. V. CAESAR
Harbor Beach, Michigan

What *lead does to control corrosion*

in producing and storing Phosphoric Acid

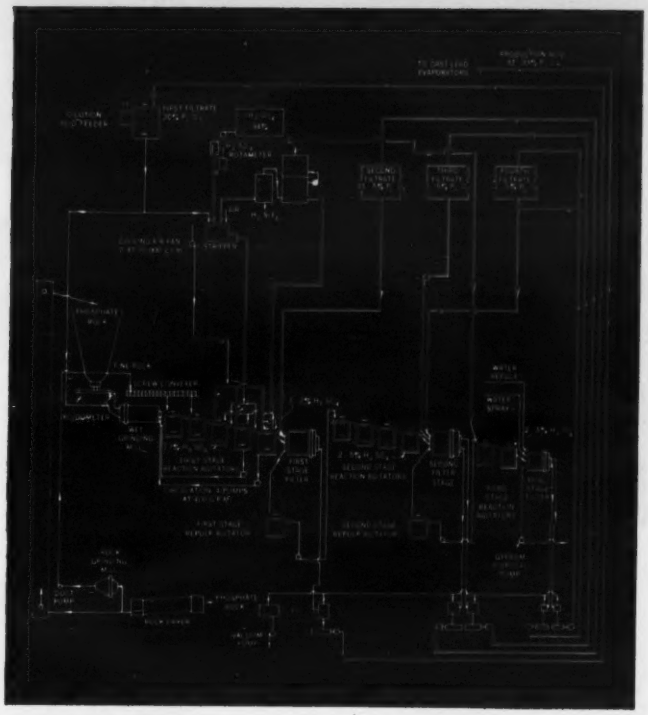
H_2SO_4 and P_2O_5 are a hungry pair.

They eat right into most metals. But *lead* takes the sharp edge off their hunger quickly.

With each of these chemicals, *lead* reacts on contact to form on the surface of the metal an insoluble and impervious film. This film stops further corrosion.

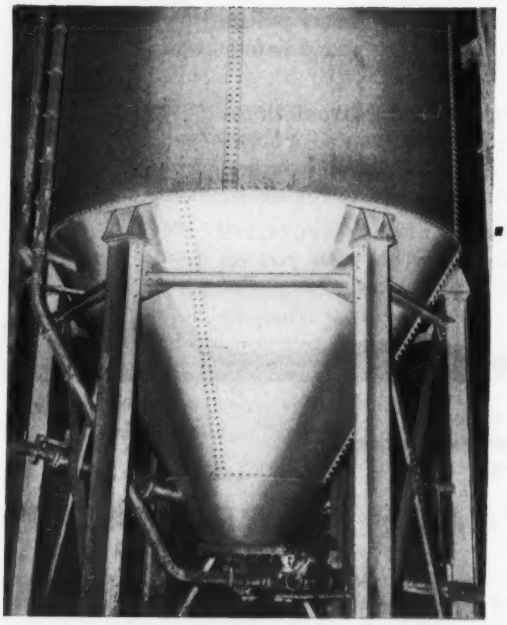
That's why *lead* has long been a "first choice" material in much of the equipment used for treating phosphate rock with sulfuric acid to produce phosphoric acid. It is used for lining vessels and tanks, in piping and pumps, in evaporator coils and for raking blades in agitators.

Recently new forms of cage-type sheet *lead* structures, new bonding and strap-lining methods, new constructions for high-temperature erosion-corrosion service and automatic stud welding techniques, have increased *lead's* usefulness . . . not only in phosphoric production but in many other applications.



What about *lead* for your own acid handling equipment . . . considered in the light of these new techniques! It's something to think about, and . . .

When you think of Lead . . .



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. . . lead-lined to last

Today, National Lead weds *lead* to steel . . . not only in pipe (Tubond®) and fittings (United®) but in massive and complex process and storage and shipping vessels, as well. In this equipment, the union is stronger than the tensile strength of *lead*. Bonded lead linings minimize troubles from vibration and severe and rapid cyclic temperature and pressure changes which can result in blistering, buckling and cracking. Creep is virtually eliminated.

In view of this and other developments, you may want to review your position on *lead-lined* tanks, stills, scrubbers, filters, piping, valves and other corrosion resisting equipment. If so, contact National Lead Company, Lead Lined Products, 111 Broadway, New York 6, N. Y.

Check 3340 opposite last page.

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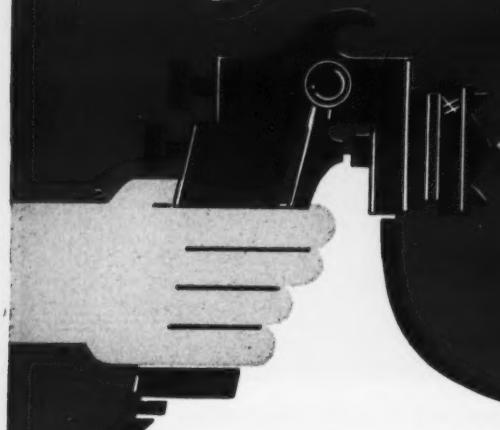
5. Reduced Odor Problems!



Studies at CSC's Lacquer Laboratories show that 2-Nitropropane and Nitromethane outperform the ketones in the preparation of vinyl spray formulations. Formulators can now take fullest advantage of the superiority of CSC Nitroparaffins in producing high-quality vinyl coatings.

High solids vinyl formulations prepared with 2-Nitropropane have good stability and show no tendency to gel during storage. 2-NP resin solutions are considerably lower in viscosity than mixtures based on medium-boiling ketones, allowing higher weights of solids in a given volume of lacquer and thus greater surface coverage.

The higher evaporation rates of the ketones normally used are serious handicaps leading to rapid setting up of films and poor flow. Flammability is a constant fire hazard. The slow evaporation rate of 2-NP and Nitromethane solutions produce good flow. The NP's have mild, agreeable odor and escape more rapidly when drying, eliminating odor problems. High flash points and low volatility are added safety features.

2-Nitropropane and Nitromethane are also excellent solvents for acrylics, cellulose acetate, cellulose acetate butyrate, and epoxy resins.

A CSC technical representative will be glad to work with you on your specific problems.

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Check 3341 opposite last page.

nuclear notes

Atomic merchant ship under construction

The world's first nuclear powered merchant ship should be in operation in 1960. Being built by the New York Shipbuilding Corp, the NS Savannah will cost $20,908,774. Propulsion system is being furnished by Babcock and Wilcox under separate contract.

The ship will be of all welded construction and have the following characteristics:

Length, ft	587
Beam, ft	78
Displacement, tons	21,800
Deadweight, tons	10,190
Normal SHP	20,000
Service speed, knots	20
Passenger capacity	60

The power plant will be of an advanced pressurized water design. Propulsion equipment will consist of a steam turbine connected to a single propeller shaft through double reduction gears.

Radiation effects info center established by Air Force

An information center has been established by the US Air Force at Battelle Memorial Institute, Columbus, Ohio. Purpose is to gather and disseminate data concerning effects of nuclear radiation on materials and systems which may be required in aircraft of the future. The center's services are also being extended to the Army, Navy, AEC, and other government agencies, as directed by the Air Force.

Radiation costs too high for processing

According to Dr. Charles H. Stockman, of B. F. Goodrich Company's Research Center at Brecksville, Ohio, nuclear radiation methods are still "too expensive" for making consumer products.

Dr. Stockman told the fourth annual conference of the Atomic Industrial Forum at the New York Coliseum

that "radiation processing has shown much promise, but its high cost as a processing tool has hindered its growth."

He said that lower cost radiation for industrial uses could probably come from spent fuel elements being "cooled" at a large central fuel-processing plant. "Such installations, operating at practical efficiencies, could provide irradiation for less than 0.1 cent per megarep pound. . ."

AEC puts low-level source under general licensing

The AEC has amended its by-product material (radioisotope) regulation to place an additional low-level radioactive sealed source under general license. The source, which may be possessed and used without specific license from the Commission, is an ion-generating tube containing not more than 50 mc of tritium.

The tube is designed for use in air conditioning and other equipment.

AEC financial report for FY 1957

The financial position of AEC at June 30, 1957, results of operations for fiscal year 1957, and other information of general use have been compiled in a 40-page report.

Some of the figures listed include cost of operations (which was $2 billion) and investment in production plants, research laboratories, and other facilities owned by AEC.

Property valuation jumped from $6.7 billion to $6.9 billion.

Sales of heavy water dropped from $5 billion in 1956 to $4.4 billion in 1957. Radioactive and stable isotope sales totaled $2.9 million as compared with $2.3 million in 1956.

Uranium and other source materials procured in 1957 cost $402 million as compared with $281 million in 1956.

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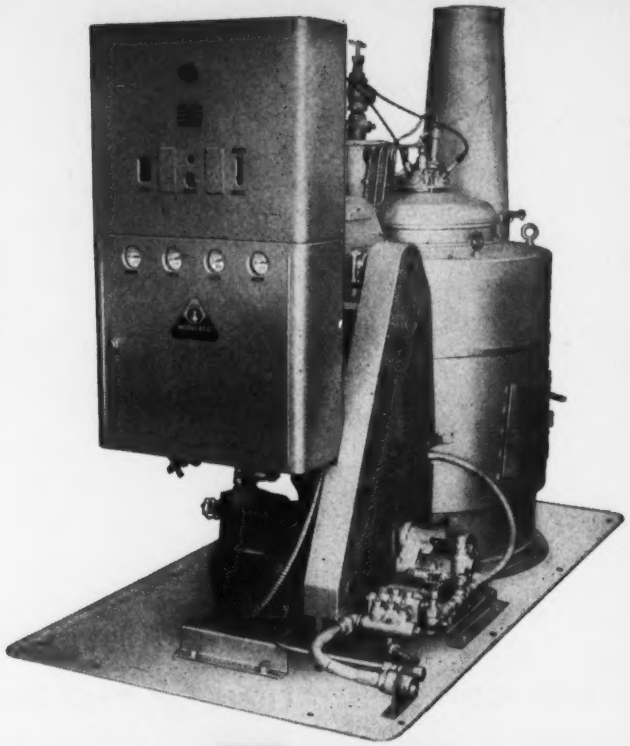

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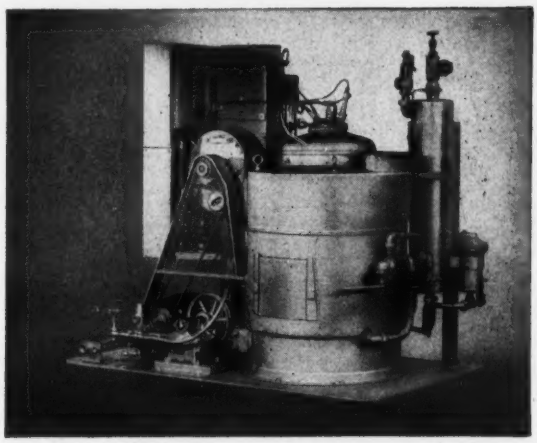
Takes No More Space Than A Desk and Chair! This pocket-size power package does a "big-boiler" job to solve your steam problems. Compact, complete, it fits anywhere . . . in unused corners, aisles, balconies . . . to provide all the steam you need, where you need it, when you want it. Fully automatic, push-button operation —set controls for pressure desired . . . Modulātic does the rest. Saves fuel—steam produced only "on demand". Clean, quiet operation . . . practically no maintenance. And for large steam requirements, multiple installations provide same steam capacity, in far less space, than conventional boilers. Single, coordinated control cuts individual units in and out to meet changing steam demands . . . far more economically and efficiently than idling larger boilers.



Sizes range from 10 to 160 h.p.; pressures from 5 to 300 p.s.i. and much more, if required. Maximum floor load, only 150 lbs./sq. ft. Choice of oil, gas, or combination burner. Steam from cold starts in 2 minutes ends early reporting and standby.

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NEW CP FEATURE

Material Handling and its role in the chemical processing industries will be featured in next month's CHEMICAL PROCESSING.

This issue will mark the first time that CP has featured this important phase of chemical production.

Many aspects will be covered

The feature will cover such related aspects of material handling as management, engineering, purchasing, financing, trends, and new developments.

These aspects will be discussed by top men in both the chemical processing and material handling fields.

There will also be several case history stories telling how other companies have been able to realize savings with improved handling methods.

Since material handling ties in with practically all operations in the chemical processing plant, there will be something of interest for everyone.

For more information on product at left, specify 3343 see information request blank opposite last page.

SRE dedicated

The first non-military reactor to produce heat for the generation of power by a private utility was recently dedicated. Known as the Sodium Reactor Experiment (SRE), it is located in the Santa Susana Mountains near Los Angeles, California. Plant has capacity of 6500 electrical kilowatts. It is the forerunner of a 75,000-kw plant to be built for the Consumers Public Power District of Columbus, Nebraska.

Radioisotope saves $$$ in uranium extraction

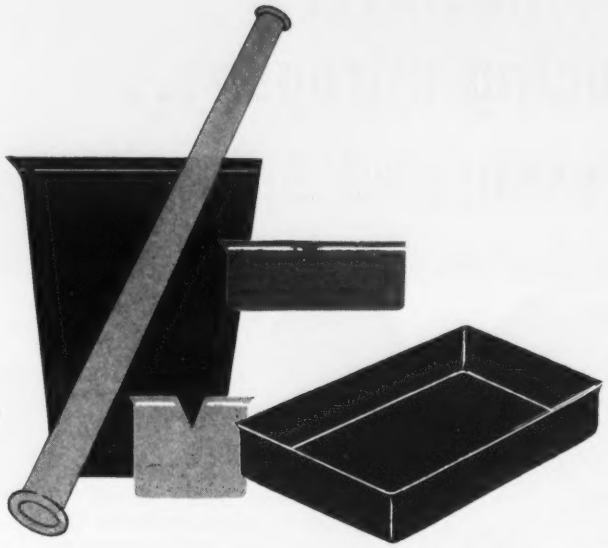
Savings of about $26,000 per year can be obtained in extracting uranium from uranium ores, through use of cesium 137 and a recording cell, says B. G. Ryle, National Lead Company.

Speaking at the recent Annual Meeting of the American Institute of Chemical Engineers, Ryle said that this was shown in an experimental operation of an extracting column.

Using 60 mc of cesium in combination with an Ohmert measuring cell, the arrangement was able to continually monitor density and uranium concentration of the product stream and control the feed rate so as to maintain continuous, efficient, steady-state column operation.

Boost seen in use of radioisotopes

Bigger supplies of radioactive materials for use in food preservation and other applications were predicted at the recent Annual meeting of the American Institute of Chemical Engineers in Chicago. Eugene Lamb, an Oak Ridge Laboratory engineer, said that as much as 200,000 curies of cesium 137 can be produced at the Oak Ridge fission products pilot plant per year. Considerable quantities of other fission products are also being produced.



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with a controllable hydrogen content—produces oxygen-free gas consisting only of nitrogen, hydrogen and water vapor. Hydrogen content can be varied and maintained as desired between 0.25% and 25%.
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BAKER'S LEADERSHIP IN PRECIOUS METALS

Check 3345 opposite last page.

NUCLEAR NOTES

Nuclear Ion Exchange — disposable reactor

Manufacturer has developed line of disposable nuclear ion exchange reactors. When used in conjunction with company's nuclear grade resins, units will exchange radioactive ions for nonradioactive ions and produce water essentially free from radioactivity.

When reactor capacity for removal of radioactivity has been reached, unit is disconnected and capped. An eyebolt facilitates handling to disposal.

(Disposable nuclear ion exchange reactor and resins are available from Belco Industrial Equipment Div., Bogue Electric Mfg. Co., 100 Pennsylvania Ave., Paterson 3, N.J.)

Check 3345A opp. last page.

Food Irradiation Reactor development suspended

AEC has announced that it has suspended activties on design and construction of Food Irradiation Reactor (FIR).

The Department of Defense has recently indicated an interest in investigation of alternative sources of gamma irradiation such as long-lived radioisotopes or spent reactor fuel elements.

Finished plastic scintillators for ultrasensitive detection

Produced in variety of shapes, forms, and sizes, finished plastic scintillator compositions for ultrasensitive detection of nuclear radiation are now available.

The devices are suitable for alpha, beta, and gamma counting. They can also be used for laboratory anti-coincidence experiments, cosmic ray application, and for ultrasensitive geophysical instruments.

(Plastic scintillators are produced by Dajac Laboratories, Chemical Div., Borden Company, 350 Madison Ave., New York 17, N.Y.)

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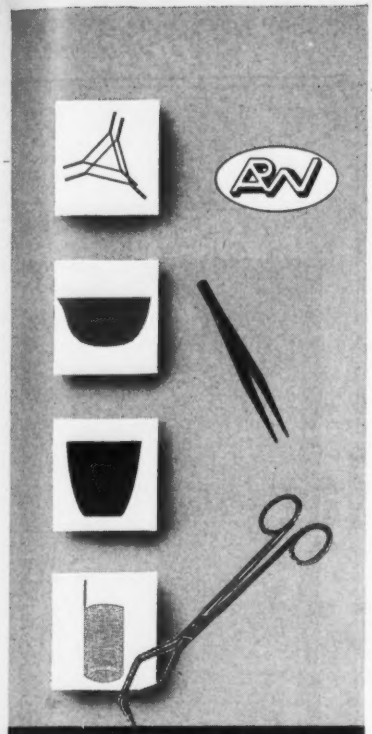

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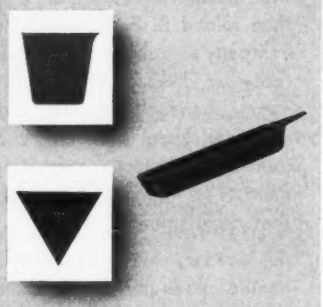

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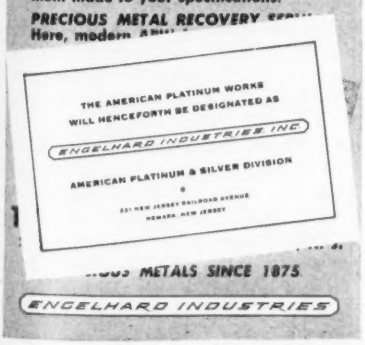

Check 3346 opposite last page

AEC revises radiation exposure limits

New maximum permissible radiation exposure limits recommended by the National Committee on Radiation Protection and Measurement have been approved by the AEC.

Main revision is the total dose limit that any individual may accumulate beyond age 18. New figures list an average of 5 rems (roentgen equivalent man) per year and not more than 15 rems in any year. Previous limit was 0.3 rems per week.

AEC gives Argonne OK for 12.5 BEV synchrotron

Argonne National Laboratory has received authorization from the AEC to proceed with design studies for a 12.5 BEV (billion electron volt) zero gradient proton synchrotron. The AEC has made available $1,500,000 of the estimated $27 million cost of the facility for detailed design work.

Appoint US Tech Director for 1958 Geneva Confab

Dr. L. D. Percival King, of the University of California's Los Alamos Scientific Laboratory, has been appointed US Technical Director for the 1958 Geneva Conference. He will have responsibility of coordinating all technical aspects of the US participation in the conference.

Reactor-grade zirconium price slashed

Now available for immediate delivery, high-grade zirconium sponge for nuclear reactors is priced at $7.50 per lb for 1000-lb lots. This is approximately one-third its 1953 price of $22.00 per lb.

(Reactor-grade zirconium is available from The Carborundum Metals Co., Akron, N.Y.)

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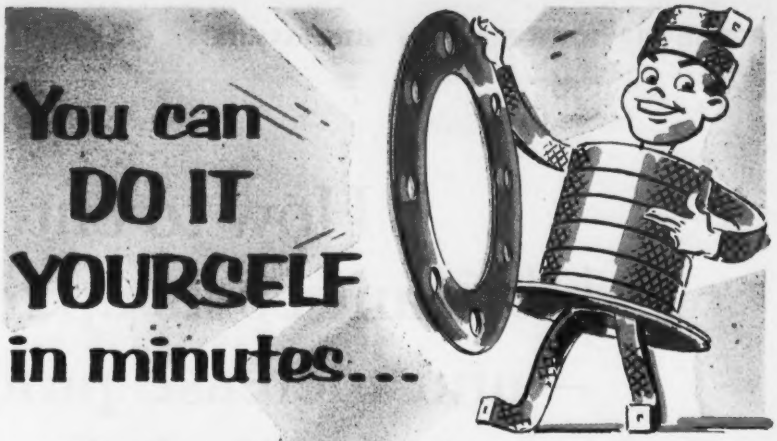

with the ALLPAX Gasket Cutter

Maintenance men from Maine to Mexico have found that they can save hours of costly "down time" with this handy kit. Accurate gaskets can be cut quickly and easily by following a few simple directions—as easily as drawing circles with a compass.

The Allpax Gasket Cutter uses the "ironing principle" to hold material flat during the sweep of the cut, and prevents buckling and tearing common with make-shift devices. All materials in general use as gaskets may be cut to diameters ranging from ¼" to 36" using the popular No. 3 kit. Other kits available for maximum diameters of 12, 24, 48 and 60 inches. Allpax Gasket Cutters and accessory tools are neatly packaged in the permanent metal tool case shown above. An 18" square cutting board is supplied with each kit.

See your local dealer for additional information on the Allpax gasket cutter and our complete line of gasket materials.

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BETTER LUBRICATION BEGINS WITH ALEMITE **OIL-MIST**

How to cut lubricant costs up to 90% — and increase production!

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The Oil-Mist system atomizes oil into air-borne particles, carries them through tubing to all lubrication points and bathes every moving surface with a cool film of clean lubricant while machines operate. It provides constant, uniform, completely automatic lubrication to a few or to hundreds of bearings. Accurate and foolproof, Oil-Mist eliminates guesswork. No bearing can be overlooked or over-lubricated.

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ALEMITE DIVISION STEWART-WARNER CORPORATION

Symbol of SW Excellence

Check 3349 opposite last page.

John R. Hoover was graduated from Harvard in 1920, attended the graduate school for a year, then joined B. F. Goodrich in the company's rubber and canvas footwear division. In 1930 he became manager of the general chemical labs, and in 1932 he joined the industry sales department. He was made manager of that department in 1936.

In January 1942 Hoover was named manager of plastic materials sales.

Hoover was named vice president — sales for Goodrich Chemical at the beginning of 1945 and, in 1951, was elected president.

Choosing the RIGHT plant site

JOHN R. HOOVER, President, B. F. Goodrich Chemical Company

The choice of a site for your new chemical plant can spell the difference between success and failure for that plant. It's that simple. An unexpected shifting of your customers' locations can seriously alter shipping costs; similarly, a shift in your own raw material sources can multiply costs a great deal. An unrecognized local labor situation can add headaches to the already headachey business of getting a new plant into efficient operation. Any one of dozens of factors can change the economics of a plant overnight.

Yet the great bulk of these factors can be spotted and predicted. Making the right decision on a site simply requires an objective look at all of the factors involved.

When beginning the search for a new plant location, we at B. F. Goodrich Chemical look in two general directions: First, the tangible; that is, the questions of shipping costs, physical characteristics of the location, availability of sufficient labor, things that can be determined or measured with relative ease.

The second area consists of factors that can't be so easily measured, the intangibles. How will the community view the arrival of a chemical plant? Will we have the full cooperation of the local government and community leaders? Will our managerial and technical people feel at home in the community?

Both areas are equally important to a good choice. B. F. Goodrich Chemical, as do most larger companies, uses a plant site committee when planning a new location. Not a standing committee, the group can be varied in size or experience as the need arises. The group that found the site for our new Henry, Illinois, plant consisted of 12 members; a committee currently in existence consists of only three men.

The First Step

Our process of finding a site is largely one of elimination; of "zeroing in," so to speak, on the final choice. And so, we begin our search.

Obviously, our first step is to determine where our markets are, and have the sales department predict the size of these markets. Here, of course, our interest isn't just in today's markets but those of ten and perhaps twenty years from now. For example, twenty years ago the textile industry was centered in New England. A company, selling to the textile field, who built a plant at that time is in a much better position today if it was able to predict the movement toward the South that the industry has taken.

The next step is to determine the source of our raw materials, bearing in mind, of course, that these sources may also change. Any data concerning geographical trends in feed stock sources are extremely valuable.

Our First Fix

This, in all probability, narrows the choice down to perhaps two or three states — a general area on the map. Now begins the weeding out.

Our first consideration at this point is that of concentration. For various reasons, we don't want to be too close to our competitors' plants, or to our own, for that matter. At the same time, we don't want to be too big a factor in any community. As a rule of thumb, we would rather not require more than one percent of the work force within a fifteen mile radius of the proposed plant. This, of course, is just an arbitrary figure and could be varied if the need should arise, but we try to stick to it if possible.

At this point in the quest we list all of the major site criteria. Will we need barge facilities or an extremely large water supply? Other transportation requirements? Large quantities of power perhaps? These requirements will eliminate some of the locations — cities or general areas — within the bounds set up, leaving perhaps a dozen or so apt ones.

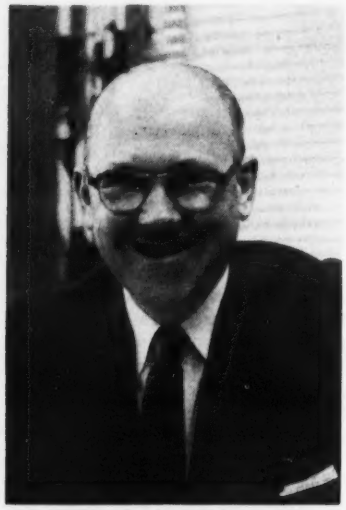
The procedures described thus far are pretty commonly followed by most companies, but beyond this point the choice sometimes become rather a "seat of the pants" operation. Personal likes and dislikes of the management can play too large a part: there

have been cases when a plant site was selected just because an executive "liked" the place. If the company following that sort of procedure is lucky, the economics of the new plant will still be favorable — too often they're not.

Having arrived at some specific locations, we now do an economic study on each of them. We're interested in such things as the availability and cost of gas and electricity, construction costs, the labor situation in the area or city. We look at such things as the city's flood history and, if on the eastern seaboard, its hurricane frequency.

We, of course, look at the real estate situation in the community. Are sites available at reasonable costs? How about the city's zoning laws?

After a pretty thorough economic study on each of the



"Learning the tone of the community isn't always easy, it's time consuming . . . yet we feel that it's worth all of the necessary efforts in terms of community acceptance and cooperation, as well as the well-being of our people"

communities, we're able to settle on perhaps six spots for further study. At this point the search turns off in two directions: the search for actual real estate in each of the towns, and a closer look at the towns from the personal standpoint.

The latter can be described as simply learning the tone of the community. It's not always easy, it's time-consuming, the resulting data aren't always easy to interpret. Yet we feel that it's well worth all of the necessary efforts in terms of community acceptance and cooperation as well as the well-being of our people.

There are lots of places to start: The school quality is as good as any. You can learn a lot about a town from its schools. How much money is spent per pupil? Are the buildings adequate? Does the city need new facilities and, if so, what steps are being taken to get them? And besides the fact that a study of the school system can give an insight into the community life, it's important that the city be able to offer a good system to your employees.

We also like to have higher educational facilities within a reasonable distance for our technical and managerial people to further their educations.

We look at the general, over-all appearance of the town, the recreational facilities, the churches, and the organizations.

It's also very important to know whether the workers in the city are mature with respect to labor-management relations. Has there been an unusual number of strikes or other labor troubles recently? A detailed study of the general labor climate of the area is certainly in order.

It's doubtful that the recent disturbances in Little Rock could be called typical of the city's entire population, or that they would have prevented a plant's being established there, but this sort of thing should be at least considered.

We try to talk to the other companies in the city. Is there generally a feeling of cooperation among the industry in the area? Do they communicate among themselves, perhaps have a local management club or technical organization?

We look at the town's workers. It's sometimes difficult but we try to ascertain whether they're industrious people and whether, simply, we can expect a day's work for a day's pay.

The areas in which to search for this sort of information are infinite, and, of course, vary with the sort of city we're looking at. Yet we feel very strongly that we should have as much of this sort of data as possible on which to base an intelligent decision.

While we're looking at the town, we're also beginning to seek specific sites for the plant. Although there are a number of sources for site information — railroads, public utilities and such — we've found that the state industrial development boards and the chambers of commerce are probably best for our purposes because they have less of a personal axe to grind. Railroads, for example, are first of all interested in selling property along their right-of-way.

As the various site sources are contacted they are given a com-

"Our process of finding a site is largely one of elimination; of 'zeroing in,' so to speak, on the final choice"

plete list of specifications for the plot — power and transportation needs, other physical requirements — not just for the initial period of operation but for as many years as can be projected. The sources will then make their recommendations. Too many recommendations, as a matter of fact, to really evaluate. Here, again, we perform the weeding out operation, getting down to perhaps eight or ten possibilities.

For these sites, we know what the actual cost per acre will be, what the specific zoning regulations are. We now know what the utility costs will be, and what facilities are available.

The city is now known to us to a great extent. We can predict to some extent what the labor situation will be, whether we will be welcomed as a part of the community, whether our people will be happy to live there.

It's now time to present these data to management. Of course, management has been following the quest all along but hasn't been involved in the details. Now they can look at the numbers. At Goodrich Chemical we'll get options on perhaps two or three sites and will actually go out and look them over.

To this point we have remained anonymous to all but the state boards, railroads, and such. Now it'll be necessary to begin talking to the tax assessors, look into arrangements for sewerage facilities and similar improvements, and get costs on grading the properties. This step calls for another effort previously unneeded — public and community relations.

Of course the real public and community relations job doesn't begin until the final site is selected. But as the city becomes aware of the fact that a company has an option on some property, the questions start and the rumors get into circulation. These sometimes take rather deft handling but it's a job that can't be ignored.

The quest is drawing to a close now. We have complete economic studies on the two or three optioned sites. The data include specific labor cost figures, actual taxation rates, quotes on property improvements. The cities involved have also been given a final, thorough study. We know what sort of cooperation to expect from the townspeople. We will be able to transfer our own managerial and technical people to the city knowing that they will be happy there. Now management can look at the figures, weigh this against that, and finally say "take that one."

Selling the Community

It's now time for the phase of the operation that can make or break the whole project — selling ourselves to the community. In order to establish good relations in a community it's necessary that the community understand us. They should know what we intend to do and what we don't intend to do. If the town feels that there are drawbacks to having a new plant located there

To bottom page 101

Management with "time to think" reaps big dividends through developments such as Chestnut Run where a different approach indicates that . . .

Customer Service Keeps Du Pont on Top

JOHN C. STEEVENS
Assistant Editor

IN a campus-like setting on the outskirts of Wilmington, Delaware, stands a group of buildings dedicated to the development of "Better Things for Better Living Through Chemistry." Symbolizing the slogan of what has been called "the greatest chemical aggregation in the world," the Chestnut Run customer service center of E. I. du Pont de Nemours & Company is one of the most complete research and development operations of its kind known to industry.

The idea of providing technical service facilities for customers is not new in the chemical industry. But the Chestnut Run center represents a different and highly successful approach to this invaluable product development and sales service function. Approximately $20 million has been invested in laboratory facilities on the 160-acre site.

This different approach to product development and sales service represents one example of the integrated, astute, and forward thinking of du Pont management — an organizational structure unique in the industry.

Because of the highly specialized nature of the chemical industry, technical service to the customer in solving his own problems is a vitally important part of the du Pont sales work. If you are selling a new automobile, you don't ordinarily have to teach the buyer how to drive in order to make the sale. But in order to increase sales, say of hydrogen peroxide, it was necessary for du Pont to develop a new continuous bleach process and to show textile manufacturers how, by installing this process, they could reduce costs and improve their production.

About 94% of all du Pont sales are in products that go to industrial users, rather than direct to the consumer, and many of them are used in highly complex processes. Consequently, most du Pont sales are made on a very different basis than those of a firm making soap, pickles — or automobiles.

Each manufacturing department in the company maintains a research division wherein research is carried on to improve the products of that department, and to develop new products in its line. Under the head of this division would come all research laboratories maintained by the department. This function of the du Pont organization is one of the most strongly encouraged, and its existence, together with the Central Research Department, is largely responsible for the fact that in recent years about half of du Pont's sales have come from products that have been introduced commercially within the past 25 years.

From Little Acorns . . .

The idea for the Chestnut Run customer service center germinated from a suggestion by the head of the development group to the management of du Pont's Textile Fibers Department in 1951. By 1950, technical service was being conducted at a number of scattered locations in the Wilmington area, as well as at distant locations. Administration had become extremely difficult and the operation was not fully adequate for customers. Consolidation of some sort, with improvements, was a necessity. The suggestion that this service and development work would be much more effective if it were organized under one roof was the immediate spark that set off the chain reaction blossoming into the Chestnut Run Center.

The first plan was to locate such an organization at an existing laboratory near Wilmington, thinking then being in terms of just a specific Textile Fibers Department activity. However, when the project was submitted to the Executive Committee, final arbiter of all top management decisions at du Pont, the Committee s u g g e s t e d that thought be given to finding a totally new location for such a laboratory. The site originally planned was largely industrial in character, and it was thought that other surroundings would be a better setting for the lab.

Such a site, combining ample space and accessibility to Wilmington, was not easy to find. After a careful search of possible sites, the department received the approval of the Executive Committee to purchase what formerly had been a 160-acre farm in the immediate suburbs. Forty-eight acres were selected by the Textile Fibers Department for its development, plans were completed, and construction started. Although planning at this stage

Typifying Du Pont's "leave no stone unturned" approach to customer service, this laminator in the Film Department's new sales development and technical service laboratory at Chestnut Run is specially designed to reproduce any of the laminating conditions a customer might encounter

Customer Service Keeps Du Pont on Top

From preceding page

was in terms of just one laboratory, the Textile Fibers Department informed all other departments in the company of its activities and offered to share the remaining ground for other customer service facilities.

Before construction was completed on the textile research laboratory, another department functions: development of basic technology required to make good end products; discovery of new end-use opportunities through study of fiber and product properties, and new processing techniques; practical evaluation of new fiber candidates and modifications of existing fibers resulting from research.

Built at a cost of $3 million, the Polychemicals Sales Service Laboratory exemplifies the different approach to customer service at Chestnut Run. The Laboratory's 62,000 sq ft of floor space are devoted to improving skills in the processing and use of products of the Polychemicals Department

— Polychemicals — entered the picture and broke ground for its sales service laboratory, followed by the Film, Organic Chemicals, Elastomer, Pigments, and Electrochemicals Departments. The germination of an idea, born of necessity, nourished by far-sighted high-level thinking made possible by du Pont's unique management concept, has flowered into a comprehensive service facility dedicated to providing a sound technical base for improvement and diversification in the use of du Pont products.

Chestnut Run Facilities

The Textile Fibers Laboratory, which began the development of the customer service center and which exemplifies the type of services offered, was completed in February 1954 at a cost of $5 million. It was constructed to carry out three major research

Other additions to the Chestnut Run customer service center include a $3-million installation constructed for the Polychemicals Department. Set up primarily to develop sound processing and design techniques for plastics, the modern, completely equipped laboratory contains an impressive array of equipment for molding, extrusion, compounding, and forming of the thermoplastic resins produced by du Pont. Nearly half of its scheduled operations are concerned with development work on new materials and processes.

The $3-million Elastomers Laboratory was designed to provide technical service on neoprene, "Hypalon" synthetic rubber, "Hylene" organic isocyanates, and rubber chemicals. It can duplicate, on a pilot-plant scale, many operations in rubber manufacture. Processing and testing facilities are of the latest type, for both liquid and dry rubbers. As an indication of its scope, the laboratory is equipped to manufacture tire treads, apply them to carcasses, them cure and test the finished tires.

A facility for research into "Freon" fluorinated hydrocarbon compounds and their applications in refrigeration, aerosols, plastics, and miscellaneous fields is housed in the Elastomers Laboratory.

Another addition to the customer service center is the $1-million laboratory equipped to duplicate or approximate closely the conditions of use of Film Department products in customers' plants and in the market place. Operations range from physical testing of products to design and development of packages and packaging machinery, investigation of problems of printing and laminating, and exploration of electrical and industrial applications of films.

A laboratory to be operated jointly by the Pigments and Electrochemicals Departments will be used for development work and customer service on titanium, silicon, pigments, sodium, peroxygen, chlorine, vinyl, and related product fields. This installation, to cost $5 million, is expected to be ready for operation by this spring.

Success Formula

All-told, du Pont manufactures more than 1200 chemical products and product lines. At present, employment totals 90,000. The company operates 74 manufacturing plants and 94 research, development, and plant technical assistance laboratories. Its annual payroll is around $530 million.

What makes this gigantic chemical complex tick? How does it continue to flourish and return 10 percent on investment? Part of the answer lies in the fact that du Pont places such importance on research — and part of it is due to the constant stream of new product developments and shrewd marketing of these developments. The function performed through customer service has been, according to many observers, the secret of du Pont's success. But behind all of these ingredients that make up a successful business lies the basic ingredient responsible for all the others — good management. Du Pont has been endowed with enlightened management — management with its sights set firmly on the future. Let's take a look at du Pont's unique concept of committee management.

Organization

The organizational plan under which the company now operates was put into effect in 1921 under the presidency of Irenee du Pont. This plan, still unchanged in its basic concepts, though subject to much flexibility in detail, set up a policy-making group at the top and sub-divided the company's activities along manufacturing and functional lines.

At the top of the organizational structure is the board of 30 directors elected by the stockholders, of which there are some 200,000. The board meets every month to consider detailed reports on all important operating and financial problems of the company. It elects the officers of the company and delegates its authority to the principal committees, Executive and Finance, and to smaller specialized committees.

Executive Committee

The Executive Committee possesses and exercises the powers of the Board of Directors in the management and direction of all the business and affairs of the company, except those reserved for other committees. It is composed of the president of the company, who serves as its chairman, and eight vice presidents. Most of the members are technically trained men. All have advanced to their posts from relatively modest positions within the company.

The Executive Committee has two sets of functions: first, those performed by it as a committee, and second, those performed by its individual members. Acting as a committee, appointed by the Board of Directors and responsible to it, this group is the policy-making body as well as the

supervisory body for all operations.

In order to carry out the organization efficiently the Executive Committee divides the operating investment of the company into operating departments and does this along lines of logical products. It considers and adopts the company's over-all policies, and it supervises and coordinates the activities of the operating departments. For example, if a department wishes to expand its activity, the Executive Committee has to consider and approve the proposal before it can be put into effect. It determines whether the proposed expansion is in a line in which the company wants to expand, whether it wants to undertake this particular type of expansion, and whether the specific project promises a sufficient return on the investment to make embarkation upon it a good business risk. All contracts above a specified amount prepared by the operating departments have to be brought to the Executive Committee for approval.

It has been said that the Executive Committee operates very much like a General Headquarters, removed from the battle. It is concerned with major strategy, while the heads

To page 84

Du Pont's Executive Committee

Organization charts are useful instruments of business procedure, although they may be used only with the admonition: "Don't mistake an organization chart for an organization. After all, it is the people who go into the jobs that make it work, or fail." Here are the backgrounds of the men, the "coaching staff" of the du Pont team, who plot the strategy and devise the plays the "quarterbacks" of the manufacturing departments put into action.

CRAWFORD H. GREENEWALT, president of the company, is chairman of the Executive Committee. He is the tenth president of du Pont, and the second man not of the du Pont name to occupy the presidency in the company's history of more than 150 years.

Mr. Greenewalt holds a BS degree in chemical engineering from MIT and started with the company as a control chemist in 1922. He has no power not derived from the Executive Committee, and on it he only has one vote.

THOMAS C. DAVIS started with the company in 1934 as manager of the Tax Division of the Treasurer's Department. He served as treasurer of du Pont from 1948 to 1954, when he was made vice president and member of the Executive Committee. Mr. Davis is a graduate of Bowman's College, Petersburg, Va., and has completed graduate work at Columbia University and LaSalle Extension University. He is a certified public accountant.

SAMUEL LENHER joined du Pont in 1929. He has been engaged in research, production, sales, and administrative functions. Starting as a research chemist, he became assistant general manager of the Organic Chemicals Department in 1950, and was elected vice president and member of the Executive Committee in 1955. Mr. Lenher obtained an AB degree from the University of Wisconsin and a PhD in physical chemistry from the University of London.

WALTER J. BEADLE joined the company in 1928 as a technical investigator in the Development Department. He was treasurer of the company from 1946 to 1948 when he resigned to become a member of the Executive Committee. Mr. Beadle holds a BS in mechanical engineering from MIT.

DAVID H. DAWSON joined du Pont in 1933 as a chemist. Mr. Dawson has served as assistant general manager in the Pigments, Fabrics and Finishes, and Textile Fibers Departments. He was elected a vice president and member of the Executive Committee in 1955. A graduate of Drexel Institute of Technology, where he received a BS degree in chemical engineering, Mr. Dawson obtained a PhD in physical chemistry from Ohio State University.

ROBERT L. RICHARDS joined the company in 1923. He began as an operator in the rayon plant at Buffalo, N. Y., and advanced to general manager of the Textile Fibers Department (formerly Rayon Department) in 1949. He was elected vice president and member of the Executive Committee in 1954. Mr. Richards holds a BS in chemical engineering from the University of Pennsylvania.

JOHN F. DALEY has been with du Pont since 1915. Prior to being made vice president and a member of the Executive Committee in 1956, Mr. Daley managed two of the company's manufacturing departments. He was general manager of the Pigments Department from 1944 to 1948, and was general manager of the Organic Chemicals Department from 1948 to 1956.

HENRY B. DU PONT entered the company as assistant treasurer in 1928. The following year he was transferred to engineering work and has since been associated prominently with engineering research and development. Mr. du Pont was elected vice president and member of the Executive Committee in 1939. He holds an AB degree from Yale University and a BS degree from MIT.

ROBERT L. HERSHEY, the newest member of the Executive Committee, was elected a director, vice president, and member Dec. 16, 1957. Dr. Hershey has been with Du Pont for 20 years in research and management positions. He was formerly general manager of the Polychemicals Department.

Dr. Hershey is a graduate and former faculty member of MIT.

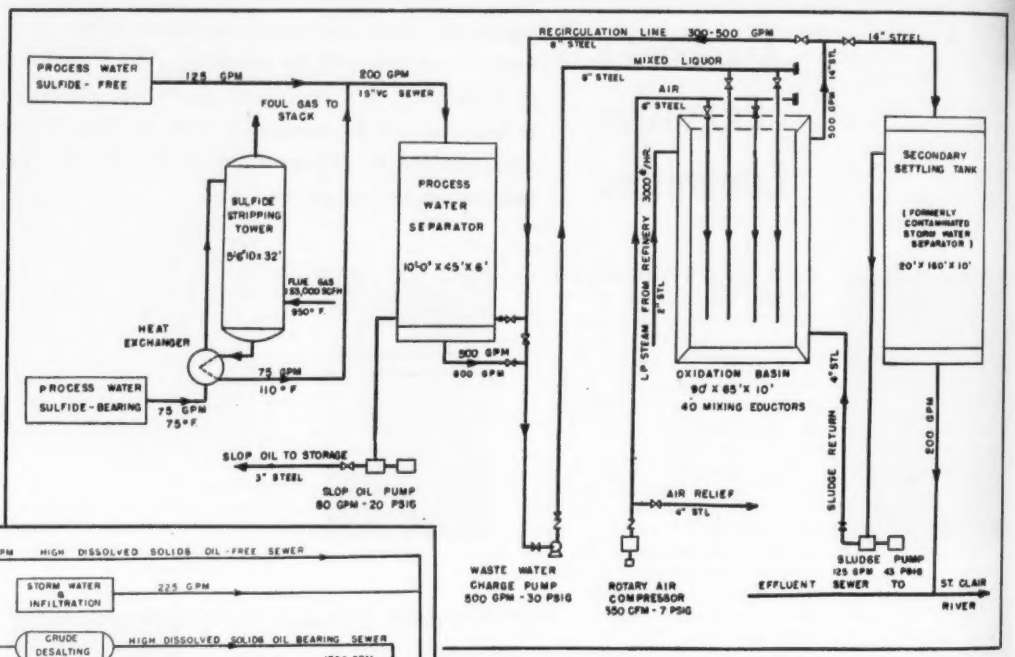
Using the same principle, but with different techniques, two refineries prove that biological oxidation can be used successfully for . . .

TREATING REFINERY

TOLEDO PROCESS OFFERED TO INDUSTRY

Sun Oil Company's process for re-use of waste water in cooling towers, as used at its Toledo Refinery, is now available to other industrial users, through an agreement signed by Sun and The Fluor Corporation, Ltd., Los Angeles. Consulting engineering and related design and construction services for other industrial users will be provided by The Fluor Products Company, 12000 E. Washington Blvd., Whittier, California.

Check 3350 opposite last page.


PROCESS WATER SULFIDE - FREE
125 GPM
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PROCESS WATER SEPARATOR
HEAT EXCHANGER
PROCESS WATER SULFIDE - BEARING
75 GPM 75°F
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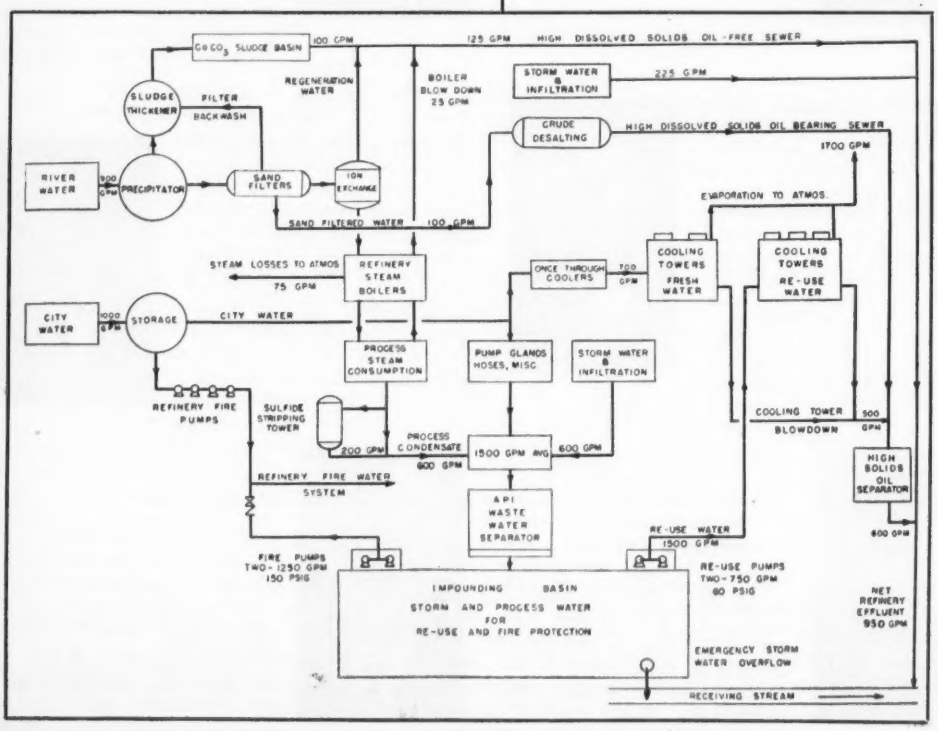
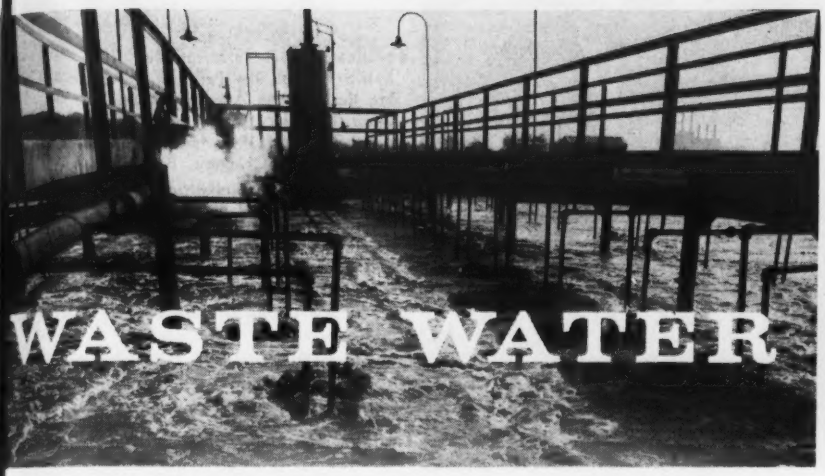
SLOP OIL TO STORAGE
SLOP OIL PUMP 80 GPM - 20 PSIG
RECIRCULATION LINE 300-500 GPM
MIXED LIQUOR
AIR
OXIDATION BASIN 90' X 65' X 10' 40 MIXING EDUCTORS
SECONDARY SETTLING TANK
AIR RELIEF
SLUDGE RETURN
SLUDGE PUMP 125 GPM 43 PSIG
EFFLUENT SEWER TO ST. CLAIR RIVER
WASTE WATER CHARGE PUMP 500 GPM - 30 PSIG
ROTARY AIR COMPRESSOR 950 CFM - 7 PSIG



At Sarnia, part of the heat required for bacterial oxidation is picked up from sulfide stripping tower; remainder is obtained by live-steam injection into oxidation basin. Other waste waters from plant (not shown in diagram) are passed through API-design oil-water separators before being discharged into effluent sewer

Because of the need for water conservation, water system at Sun Oil Company's Toledo refinery is set up for the re-use of all process and plant waste waters. Biological oxidation is carried out in cooling towers

WASTE WATER



Oxidation basin at Sarnia measures 90x65x10 ft deep. Air, to provide oxygen and adequate mixing, is supplied through nest of 40 eductors

Biological oxidation of phenolic-bearing waste water is conducted in this 18,000-gpm redwood cooling tower at Toledo

TED F. MEINHOLD, Associate Editor
With **HAROLD F. ELKIN,** Engineering Division
and **GORDON R. HENDERSON,** Manager
Sarnia Refinery Sun Oil Company

Pollution control and water conservation — long a source of industrial headaches — are problems becoming more important every day. Plant expansion is on the increase, and with it comes the demand for greater water supplies and bigger and better waste treating facilities.

Industry is making progress, however. Take the case of Sun Oil Company. A few years ago, the company developed a bacterial oxidation process for treating refinery waste waters. Previously untried in a petroleum refinery, they made it work in two different ways at two different locations: Toledo, Ohio and Sarnia, Ontario.

The two refineries offer excellent examples of completely opposite approaches to plant water usage and disposal. The Toledo refinery is located inland, while the Sarnia plant is situated along the St. Clair River. Water conservation is a must at Toledo (see Chemical Processing, May 1956, pages 32-33). Sarnia, on the other hand, having an ample supply of water, uses a system with no special provision for water conservation. The main requirement is that the waste waters be cleaned before being returned to the river.

Each of the refineries produces phenols and organic contaminants in its waste waters. Specific temperatures (80 to 120°F) must be maintained for bacterial oxidation to do its work properly. At Toledo, the water automatically picks up the required amount of heat as it cools the refinery equipment. Heat has to be added separately to the water at Sarnia. Some is picked up from the flue-gas stripping tower, but most of it is obtained by direct injection of steam.

Toledo Started in '54

Toledo's system was in planning for about six years. Sarnia's was accomplished virtually overnight. Process and project design work on the Toledo water system ran from 1951 through 1953; it was completed and put in operation in November 1954, one year after Sarnia's became operative.

Without much pre-planning, construction of the water treating set-up at Sarnia started two weeks after the decision was made to go ahead. The Sarnia installation represented the first biological treating unit used on a commercial scale in an oil refinery. It was designed in October 1953, and went into operation the next month (see Chemical Processing, April 1954, pages 58-59).

Building of the bio-oxidation facilities was expedited by the use of existing process sewer and separator systems. From the very first day of operation, Sarnia waste waters were treated by modified activated sludge facilities. Two tank-truck loads of concentrated bacterial sludge were used as the initial seed. Bacterial oxidation of phenol began within the first few hours.

Because of the need for water conservation, the Toledo refinery uses a re-circulating system (see chart) for all process and plant waste waters. Cooling towers were selected as the equipment to utilize the re-use waters, primarily because of their high volume demand and their ability to serve as treatment units for biological oxidation. Use of the towers for this purpose also eliminated the need for extensive waste-treatment equipment for final effluent improvement.

No planned bacterial seed was necessary to initiate the growth of an active colony of bacteria at Toledo.

The presence of bacterial sludge was noted within several hours after injection of the phenolic-bearing waste water. The bacteria was probably naturally airborne and waterborne.

Waste Waters Separated

To maintain satisfactory quality of the circulating water, plant waste waters are segregated at their source. No pretreatment other than gravity separation for removal of oil and separable solids is used. This is followed by retention in an impounding basin for further equalizing and initial biological oxidation.

Results in both plants have exceeded expectations. Nearly four years of operation at Sarnia and two years at Toledo, have shown without a doubt, that the activated sludge and trickling filter processes can be used successfully on refinery waste waters.

(Further information about use of biological oxidation for treating refinery waste waters can be obtained from Sun Oil Company, Philadelphia 3, Pennsylvania.)

Check 3351 opposite last page.

McKeen has recently returned from a trip through the Far East, surveying the far-flung Asian operations of Pfizer. Here he is shown presenting a gift of drugs to Her Imperial Highness, Princess Chichibu, sister-in-law of the Emperor of Japan, and visiting a centuries-old herb drugstore in Kyoto, Japan, accompanied by Gohei Tanabe, president of Japan's oldest pharmaceutical company, and Dr. K. Kimura, professor of Pharmacology at Kyoto University

ASIA: one of the world's fastest-growing markets

JOHN E. McKEEN
President and Chairman of the Board
Chas. Pfizer & Company, Inc.

One of the phenomena of the post-war era has been the steady increase in US exports to Asia — up 158 percent from 1948 to 1955. This is an impressive increase considering the fact that during that same period total US exports went up only 29 percent. And since 1955 the United States has shipped still larger quantities of goods to the Far East — over a billion dollars worth of goods and services to Japan alone last year. To American economists the trend is clear: The free countries of Asia have opened their doors as never before to US products and have become one of the fastest-growing market areas in the world.

To pharmaceutical and chemical firms this trend has special importance. In 1955, according to government figures, the industry sold approximately $40 million worth of pharmaceuticals to the Far East. The 1957 total should reach nearly $45 million.

But these export figures are small when compared with the sales *potential* of Asia. Even ignoring Red China, i m a g i n e what the situation would be if we could trade with the other Asian countries without the present currency exchange problems.

And imagine how much more extensive this market area would be if the free nations of Asia, with over a b i l l i o n people, reached a standard of living equal to that of the United States. Although Western observers may think this is unattainable in the near future, the people of Asia are moving rapidly to achieve their goal of better home conditions for themselves and greater opportunities for their children.

Totalitarianism Possible

Asia at the present time offers a rare opportunity to the Free World to help mold the industrial revolution in the Far East along lines of free enterprise. But if we do not act decisively we may lose out to a totalitarian system that is wooing the free Asians skillfully and, in some cases, successfully. Some observers believe that before the Twentieth Century ends, many countries in East Asia will become full industrial powers, thus making it imperative that American industry lose no time in assisting the growth of private enterprise in the area.

American industry has a good deal to give these countries — in technical know-how, in production and engineering talent, in cash that can be used for setting up and expanding operations. And American industry can gain a good deal from these countries in terms of expanded markets that are vital to our growth

But there is no room in the Far East for reckless profiters who seek to exploit Asian countries and their people. If we are to build and maintain successful foreign trade relations we must help raise the economic standards and living conditions in the countries where we do business.

For that reason, during my recent trip to the Far East a graduate medical fellowship program was established by Pfizer in Japan to provide fellowships at authorized medical schools and other research institutions for graduate medical students. By this means we hope to pay tribute to the Japanese physicians and enable them to make even g r e a t e r contributions in the battle against disease and death.

In setting up these fellowships we emphasized that, although Pfizer is providing the money, we are not seeking to control the program. The recipients of the awards are under no obligation to Pfizer-Taito, our joint manufacturing and distributing corporation in Japan. And the results and s e l e c t i o n s will be controlled by a special committee organized by the Japanese Medical Association and the Japanese Association of Medical Science.

Antibiotics: A Gift

We at Pfizer also feel that American business must be prepared to do its share to solve some of the problems of the Orient. During my visit to the Far East we presented $22,000 worth of Pfizer antibiotics to the governor of Hong Kong to help treat the refugees from Red China. It was our hope, in presenting these antibiotics, that the gift might point the way for others and impress upon the world the urgent necessity of dealing promptly and d e c i s i v e l y with refugee problems, wherever they may arise.

But foreign trade cannot be a one-way street. One p r o b l e m that must be faced by the Asian governments is whether they are providing enough incentives to attract business.

An example of what these countries can do was given recently by the governments of the Philippine Islands and Taiwan, which authorized profit remit-

tance and capital repatriation The Philippines also grants income tax exemptions for 10 years for certain new and necessary industries. Pakistan offers many of these same advantages plus a special arrangement permitting accelerated amortization.

To establish ourselves as a part of Asian industry, Pfizer began with plants in Japan and the Philippines, and we are currently considering building packaging plants in India and Australia. Pfizer began its manufacturing operation in Japan in 1955 by setting up a joint manufacturing and distributing corporation with the Japanese firm of Taito Co., Ltd., a pharmaceutical and sugar refining company. Our new enterprise, called Pfizer Taito, produces, promotes, and distributes antibiotics, vitamins, and other drugs in Japan and Okinawa, and also acts as agent for Pfizer's chemical and agricultural products.

Pfizer's Hong Kong Branch

In Hong Kong, the Pfizer branch supervises sales in the marketing areas of Hong Kong, Korea, Formosa, Thailand, Malaya, Cambodia, Viet Nam, and Indonesia. The branch also stocks and distributes bulk and finished goods to such widely scattered countries as Australia, In-

JOHN E. McKEEN has been associated with Pfizer for his entire business career. He was graduated from the Polytechnic Institute of Brooklyn in 1926, and the day after his graduation became a control chemist for Pfizer. He later was made process development engineer for a number of departments before he became an assistant department head.

In 1935 he was appointed head of one of the manufacturing departments, and became assistant superintendent of the company's Brooklyn plant in 1938.

In 1942 he was made superintendent of the plant, in 1944 he was appointed to the board of directors, and a year later became a vice president. He was elected executive vice president in 1948, president in 1949. In 1950 he was made, in addition, chairman of the board.

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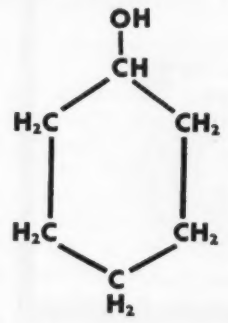

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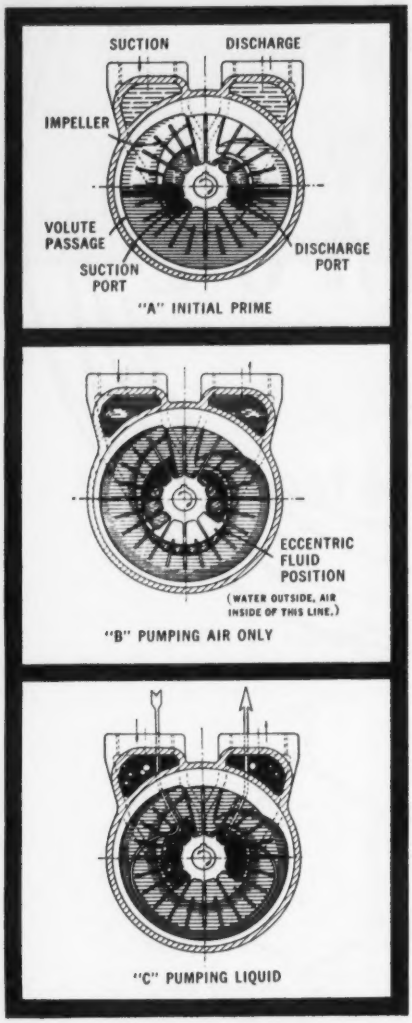

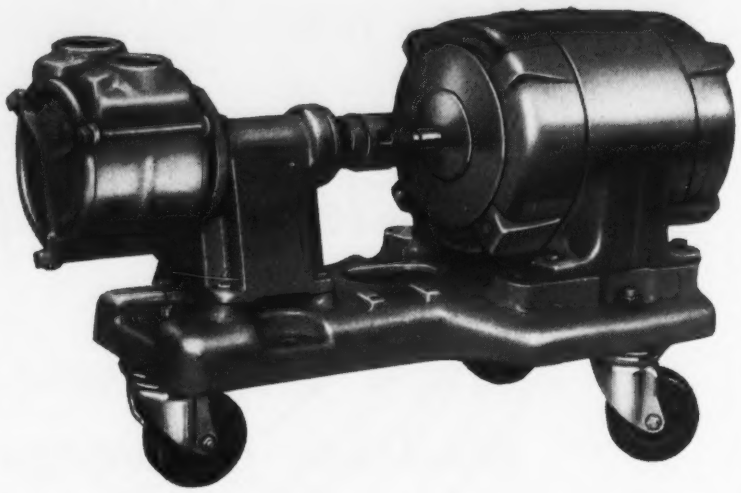

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The Goulds Fig. 2520 pump is available in all-iron construction, or in stainless steel for corrosive service. Offered as a mobile unit (as illustrated), pump-motor unit, or pump only for V-belt drive. With 1½ inch suction and discharge, the pump itself weighs 42 pounds. Capacities to 60 GPM, heads to 80 ft.

There's a complete description of the pump in Bulletin 725.6. Write for a copy or contact your Goulds representative.

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Check 3353 opposite last page.

Asian Market

From preceding page

dia, New Zealand, and Ceylon.

To promote Pfizer products abroad, we have used the same methods developed in the United States, including direct mail and medical journal advertising. But the decision to promote a product is left to those in close touch with the free Asian market — the general and area managers.

Supply Problems

In solving the many problems of supplying our overseas branches — problems such as shipping arrangements, licenses, currency exchange, custom regulations, trade-mark clearances, government sanction of manufacture and sale, product promotion and others — we have found we can best serve foreign countries by considering them as individual domestic markets rather than as a segment of some broader pattern of export trade.

To sell products overseas our aim has been to become a part of the economy of the foreign countries, and this is especially true in Asia. We usually begin by exporting to a country. As the demand for our products grows, we develop a local sales organization. When this sales organization becomes successful and our volume of business reaches a certain level, we often find that we cannot expand our operations any further because of high shipping costs, high duties, or insufficient foreign exchange allocations. If we are to continue to grow, we must then consider investing in a pharmaceutical manufacturing plant — and this can represent a fairly sizeable investment.

Manufacture Locally

For instance, we found that we could do more than three times the amount of business in the Philippines by undertaking the manufacturing of our products locally in that country, because their government allows more favorable allocation of dollars to import bulk materials than to import finished products. To-

day, as a direct result of our new packaging plant near Manila, Pfizer employs over 100 persons in the Philippines — only three are Americans, the others are Filipinos.

But Pfizer adheres to no rigid pattern to establish itself in a foreign market. It's usually a compromise between necessity and desire that determines what the final marketing arrangements will be. Because of the changing political climates and trade situations we must have great flexibility in making our plans.

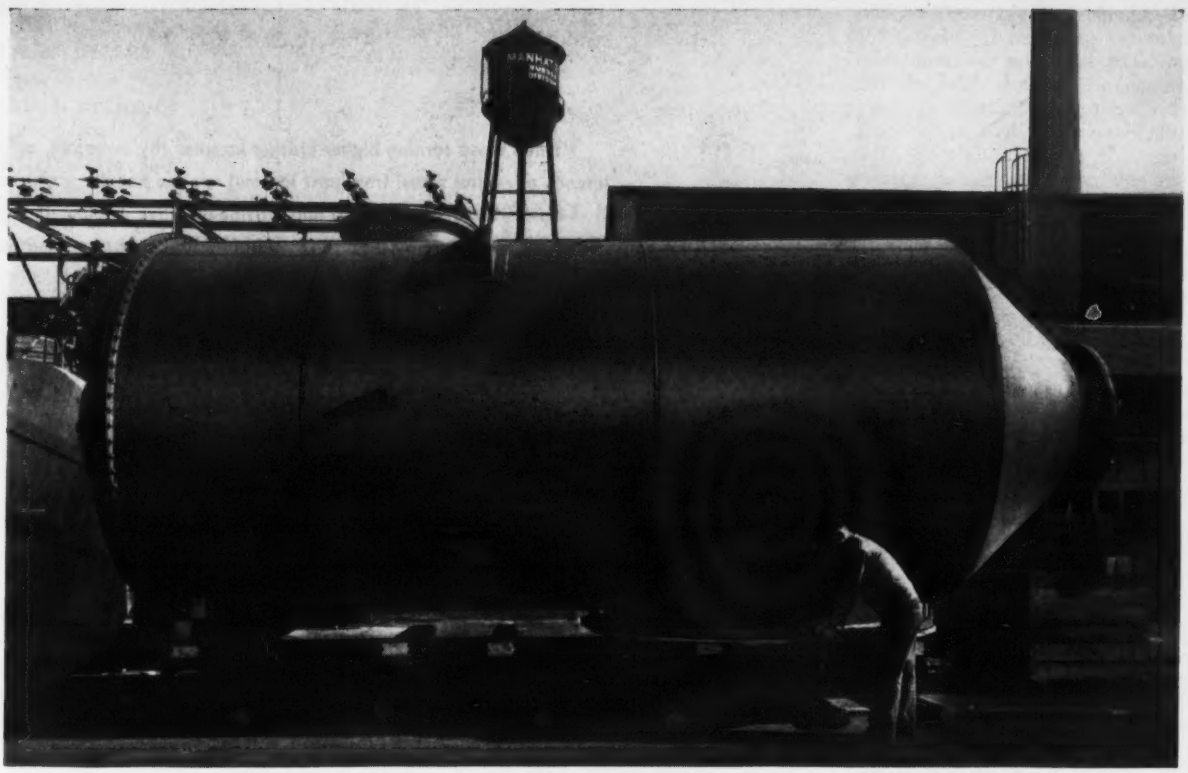
Solving Problems

It is always very difficult, if not impossible, to discuss American business problems in the Far East in general terms. Many common problems do occasionally crop up, but often they are problems of degree — internal political strife and border conflicts, the threats of the common enemy, and the scars which broken promises and past colonialism have left on national pride. In our Asian business operations, in each of the 18 different Far Eastern countries we do business with, we have eventually been faced with 18 different sets of problems.

Solving these problems has not been easy but it has paid off by establishing Pfizer on the ground floor in one of the world's fastest-growing market areas and has contributed to human welfare in the 18 Far East countries that we serve. ■

March issue to feature material handling

Next month's issue of CHEMICAL PROCESSING will feature material handling and its role in the chemical processing industries. Various aspects of material handling will be discussed by top men in both the chemical processing and material handling fields. In addition, a number of case histories will relate how other companies have realized savings from improved handling methods.



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"When those earning higher-bracket incomes (by invention, organizing ability, special talents, or capital saved from past income) are too heavily taxed, private enterprise is undermined and cannot expand and provide lucrative employment." This revealing study shows how constantly increasing capital investment has proved the dynamic force for . . .

Raising the Workingman's Scale of Living

DR. WILLFORD I. KING

Dr. Willford I. King has had more than 35 years of experience as a teacher and consultant in the field of economics. He is a well-versed and highly qualified authority on money, credit, prices, and business cycles. Much of his attention has been devoted to ways of increasing the real income of the workingman.

Dr. King has been economist for the Committee For Constitutional Government since 1945. Prior to that time he was Professor of Economics (now Emeritus) at New York University for 18 years. He holds a PhD from the University of Wisconsin and an LLD from the University of Nebraska.

Author of hundreds of magazine and newspaper articles, Dr. King has also written numerous books on statistics and economics.

In every nation in which the people rule, the dominant economic philosophy is almost certainly expressed by the slogan — "The greatest good to the greatest number." Since, in the modern industrial area, the majority of the gainfully occupied receive most of their income in the form of wages, the slogan is equivalent to demanding the highest possible average annual pay for wage workers. In urban areas, wage workers and their wives cast a clear majority of all ballots, and, human nature being what it is, they are likely to vote consistently for the candidates and policy which they believe will enable them to get the most of the necessities and comforts which they desire.

In the last century, American factory workers have made **amazing** economic advancement. Indeed, in 1955, average hourly earnings of factory workers were **twenty-four times** as high as they were in 1850. Much of this nominal increase is, of course, explained by shrinkage in the purchasing power of the dollar. But, the rise in average hourly earnings, after corrections for changes in the value of money, indicates that, in 1955, the average factory worker's hourly wage would buy **six times** the volume of necessities and luxuries purchasable with an hour's wage of the factory worker of 1850 — an amazing advance.

This means that if today's worker were to put in but 12 hours of labor per week, he could live as well as did his great-grandfather who worked 69 hours per week! However, prosperity has caused factory workers in general to take a considerable part of their gains in the form of more leisure. Nevertheless, by working only 41 hours instead of the 69 hours put in by his great-grandfather, today's factory worker can live **four times** as well as did his counterpart of a century ago.

What are the factors that have been primarily responsible for this remarkable uplift of the typical scales of living of the employees in our largest urban industry?

Half a century ago, the **real** earnings of the average factory worker were only about one-fourth as large as at present. Was this because, in those days, grasping employers ruthlessly exploited helpless unorganized workers? Not at all!

There was just one reason why workers then had such meager earnings. **They produced little.** Modern complex automatic power-driven machines had not come into being. So, output per man was small. This fact is shown by Chart 4.

But many thoughtful persons may claim that a large part of the advance in average real earnings is correctly ascribable to the fact that efficient unions have compelled greedy employers to turn over to labor a much increased proportion of the industrial product. Is this contention supported by the facts? A glance at Chart 1 gives the answer. Clearly, the marked growth in union membership which has occurred in the last twenty years has brought about no increase in the employees' percentage share of the net value product of all corporations in our nation. Further weighty evidence that the astounding advance in the economic welfare of American wage workers has not been caused by an enlargement in their percentage share in the product of our industries is furnished by the Census of Manufacturers. Chart 2 records the facts in this connection as shown by the United States Census Bureau.

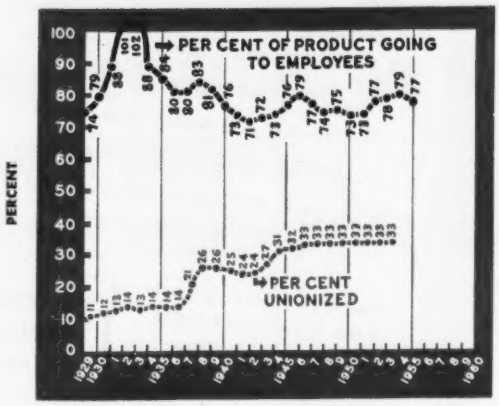
Fixity of Labor's Share in Industry Output

Chart 2, based entirely upon United States Census data, shows that labor's share of the customer's dollar remains almost constant year after year, decade after decade, in good times and bad, in Republican and Democratic administrations, under the Old Deal and the New, whether labor is unorganized or welded into powerful unions. Thus, in the entire manufacturing industry, the share received by labor out of the "value added by manufacture" — in other words out of all the money which the industry has available to cover taxes, miscellaneous expenses, wages, salaries, rent, interest, dividends, and other profits — was 39.2% in 1909 and 39.4 in 1935; was 40.2% in 1914, and 40.3 in 1953. Although the percentage had been lower in the depth of the depression, it rose to the old level when recovery occurred.

The share of wages in the gross value of manufacturing output also shows marked sta-

CHART 1

THE EMPLOYEES' SHARE in the TOTAL NET VALUE PRODUCT of ALL CORPORATIONS IN THE UNITED STATES* compared with the PER CENT OF URBAN EMPLOYEES UNIONIZED†

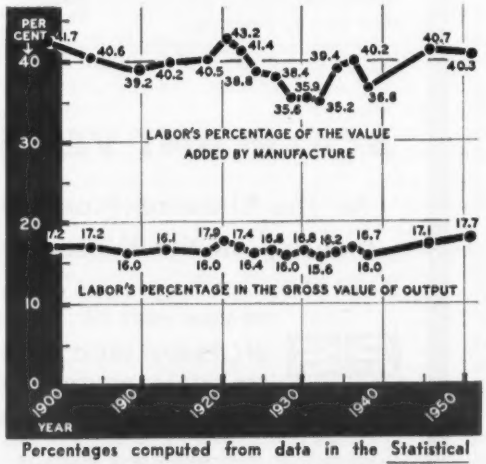


*Computed from data in Table XII of the National Income Supplement to the U.S. Survey of Current Business.

†Computed from number of non-agricultural employees as reported in the U.S. Statistical Abstract and the total number of union members as estimated by Dr. Leo Wolman of the National Bureau of Economic Research.

CHART 2

LABOR'S SHARE IN THE VALUE OUTPUT OF MANUFACTURING (UNITED STATES)



Percentages computed from data in the Statistical Abstract of the United States and the U.S. Survey of Current Business.

CHART 3

DISTRIBUTION BY INCOME GROUPS OF NATIONAL INCOME AND TAXES PAID IN 1952 INDIVIDUAL INCOME IN THOUSANDS OF DOLLARS

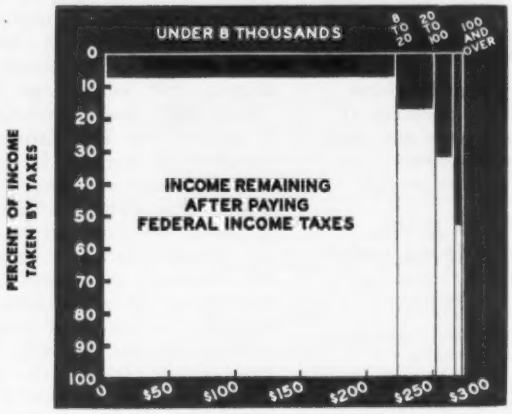
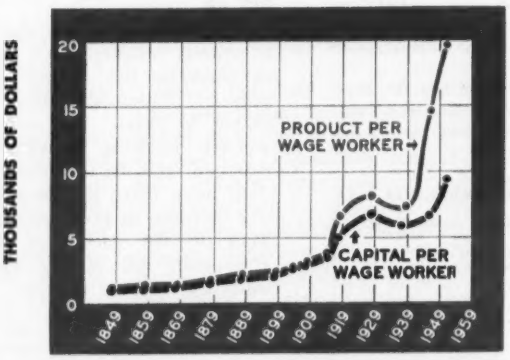

UNDER 8 THOUSANDS
8 TO 20
20 TO 100
100 AND OVER
PERCENT OF INCOME TAKEN BY TAXES
INCOME REMAINING AFTER PAYING FEDERAL INCOME TAXES
NATIONAL INCOME IN BILLIONS

CHART 4

CAPITAL INVESTMENT AND VALUE OF GROSS ANNUAL PRODUCT PER WAGE EARNER IN MANUFACTURING (UNITED STATES)



bility. Thus labor received, in 1909, 16.0% of the gross value of manufactures, and still received 16.0 in 1939, despite the occurrence of World War I, the Great Depression, and the rise of the CIO. The slight effect that unionization has had upon this ratio is shown by the fact that, in the automobile industry, unorganized labor in 1929 and 1933 received 13.9 and 13.6% of gross sales. In 1937, despite successful strikes and almost complete unionization, labor's share in gross sales rose only to 14.6%. Similarly, in the steel industry the respective proportions of gross sales going to labor in 1929 and 1933, before organization, were 19.5 and 20.4%. In 1939, after organization, the share was 19.9%.[1] Were it possible for labor to raise materially its proportional share by organizing, the CIO leaders, being experts in collective bargaining, would doubtless have lifted sharply the percentage going to the wage worker.

While Chart 1 indicates that the employees got between three-fourths and four-fifths of the combined value product of all corporations, Chart 2 shows that wage workers receive but two-fifths of the value added by manufacture. It may therefore appear that it would be possible for the workingman to gain considerably by enlarging his **percentage** of the value produced by industry. The fact is, however, that after the employing concerns have covered depreciation, rent, interest, insurance, power, clerical salaries, and wage costs the fraction of the value product remaining to constitute the salaries of executives and profits is very small. The apportionment in 1953 of the total distributable income of all corporations, as reported in Table 12 of the United States **Survey of Current Business** for July 1956 is: officers salaries, 6.0%; other wages and salaries, 83.2%; dividends, 6.2%; corporation savings, 4.6%.

One needs only to glance at these figures to see that when strong labor unions force up wage rates in some industry by a percentage greater than the growth of production in that industry, and hence compel the corporations in that field to raise the prices of their products, most of the added cost will be borne by wage workers, for, since they

1. *Statistical Abstract of the U.S., 1938, pp 753 and 773; 1941, pp 869 and 875.*

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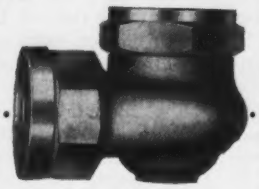

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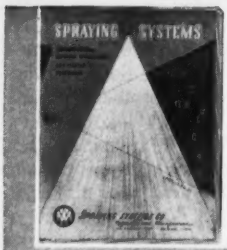

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have the bulk of the nation's income, they are the principal customers for the finished products of industry in general in the form in which such products reach the consumer. Clearly, any gains the wage worker could make by absorbing part of the money going to officials and stockholders would be trivial as compared to the advances which they have attained in recent years.

But communists and other critics of the competitive system commonly hold that the lot of "the common man" could be greatly improved by seizing the income of the "plutocrats" and distributing it among the less fortunate members of society. It takes only a glance at Chart 3 to dispel this illusion. Clearly, the total after-tax income of all persons having a before-tax income of $100,000 or more is a mere bagatelle as compared to the total income of those persons receiving less than $8000. It follows that American wage workers cannot noticeably improve their lots by encroaching upon incomes of the more prosperous.

The Prime Determinant

However, as the facts show, the American workingman has, during the past century, made economic progress unparalleled in history, and this has been accomplished without curtailing the shares of the other participants in production. What has been responsible for this remarkable advance? The answer is that it has been brought about by **rising output per worker. And the only chance of continuing this advancement is to keep production per worker moving up.**

And has the great growth in output resulted from harder work by the average employee? Obviously, the reverse is true, for average weekly working hours have dropped from 69 to around 40. Just how, then, is this amazing increase in production per man to be accounted for? Practically all of the credit must go to three factors:

1. Inventive genius.
2. Application of steam and electric power.

To page 99

Laboratory Services

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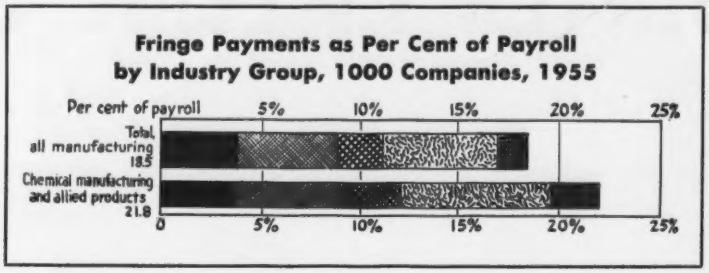
Fringe Benefits...

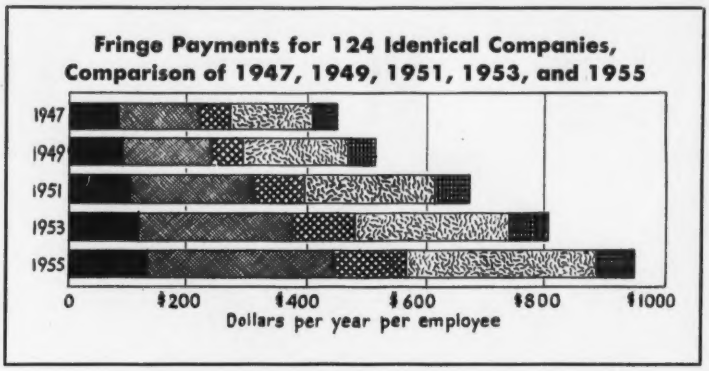
ARE YOU PAYING THE WAY FOR A UNION'S PUBLIC RELATIONS PROGRAM?

Chemical companies spend almost 24% of their payroll on employee fringe benefits. Here are some tips for management on how to get full employee recognition for this tremendous dollar outlay



Legally required payments
Pension and other agreed-upon payments
Paid rest periods, lunch periods, etc.
Payment for time not worked
Profit-sharing payments, bonuses, etc.

Source: Chamber of Commerce of the United States, Washington, D.C.



WILLIAM H. SMITH, JR., Director, Research and Analysis Department
Federated Employers of San Francisco*

Unions have been quick to take all the credit for more and better fringe benefits. Their newspapers and bulletins always carry articles on the fine benefits that employees are receiving. Their welfare plan pamphlets and other materials rarely mention the employer.

Administration of welfare and pension plans frequently is taken over by the union. In these instances, if the employer gets any positive advantage from these generous benefits it is largely accidental. He pays the bill, and the union gets most of the credit.

Today, as shown in charts above, not only is over one-fifth of a chemical manufacturing company's payroll going toward fringe benefits, but this is steadily increasing. This is true not only for chemical companies but industry in general, as shown by the chart above. In the chemical industry in 1949 about 16.5 percent of the payroll went for fringe benefits. By the end of 1955 that had increased to nearly 22 percent of the payroll. At this rate of increase, about 24 percent of the payroll is being spent by chemical companies today for employee fringe benefits.

A recent Dept. of Commerce survey shows that fringe benefits for all industry increased nearly six times in the period between 1929 and 1955. The cost of all fringe benefits in 1929 was about three percent of the payroll — in 1955 they comprised about 17 percent of the nation's payroll.

Is the employer repaid for these benefits through increased worker productivity and reduced labor turnover? The truth is we don't really know. No reliable studies give a clear answer.

Many employers hope to build morale and gain loyalty of their workers by providing extra benefits. Other employers do so only under pressure, and through necessity of being competitive in the labor market. Whatever the reason, fringe benefits are here to stay, and employees have come to take them for granted as part of normal compensation.

We do know that employees have become more security conscious, that they are attracted by companies which not only pay well but offer generous fringe benefits as well. Those companies with generous employee benefits are usually thought of as "good places to work."

Use Positive Program

Your company can develop this reputation by following a policy of telling prospective employees and periodically reminding present employees about your company benefits. Don't let employees take these benefits for granted. This is fatal — not only because the positive values of the fringe benetfits are lost, but because abuses by employees and other administrative problems arise.

Management is beginning to

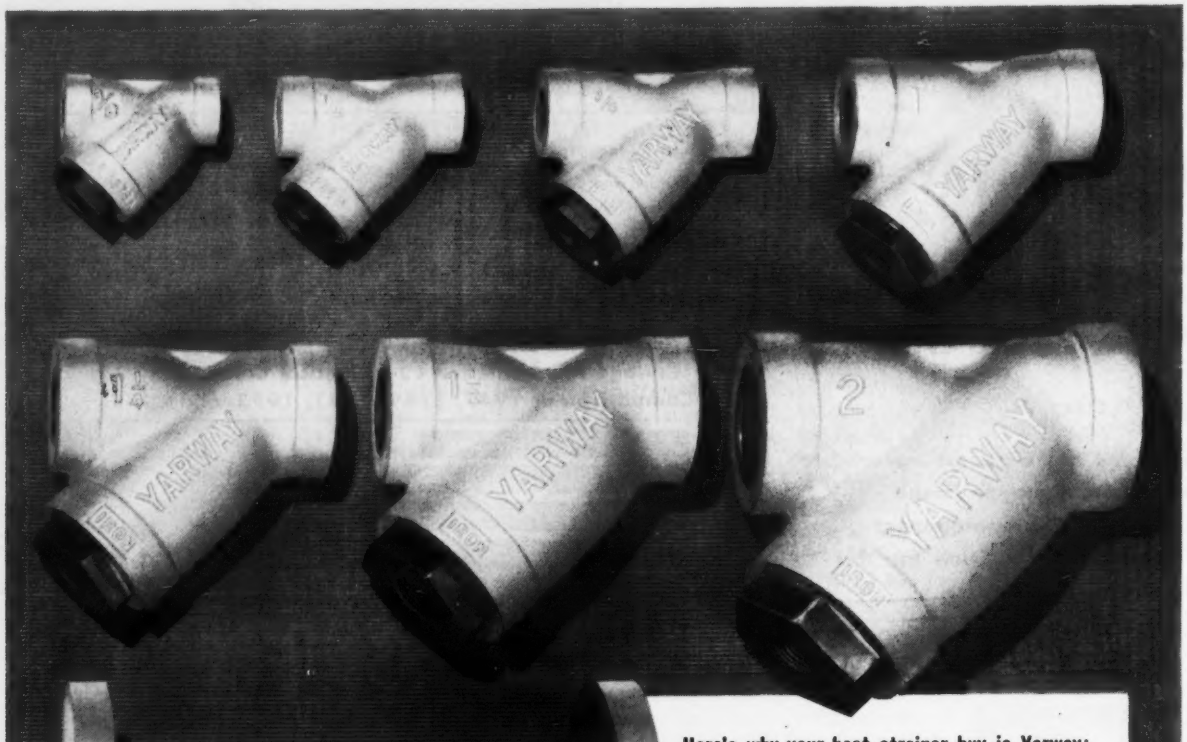
***Federated Employers of San Francisco**

is a non-profit organization of individual employers and affiliated industry associations. Services to members include facts and figures on labor relations practices and trends, information on employee relations: personnel management problems, and interpretation of State and Federal laws and regulations dealing with labor matters. In addition, the organization maintains liaison with other employer organizations on legislative problems, and serves as a management spokesman before legislative and civic groups.

Included among its member companies in the chemical industry are: Atlas Powder Company, Diamond Alkali Company, Ethyl Corp., Food Machinery & Chemical Corp., General Aniline & Film Corp., Eastman Kodak Company, Stauffer Chemical Company, and Union Carbide Corp. More information about the Federation can be obtained by writing to Federated Employers of San Francisco, 2 Pine St., San Francisco 11, Calif.

BETTER PIPELINE STRAINERS

. . . BY YARWAY



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YARWAY . a good way to specify strainers

Check 3359 opposite last page.

realize that most employees have become accustomed to fringe benefits and are taking them for granted. Only a new or enlarged benefit is of interest, and then only for a short time. And even those executives and managers who are aware of the problems have only vague, hazy ideas of what to do to counteract this indifferent attitude.

We know that repetition is the key to successful communication in advertising, education, and politics. A great deal depends on your employee communications, too. If you want to get positive results from your fringe benefits, you must make sure that employees know:

1) *what* these benefits are,
2) *how* they effect the employee individually, and
3) *why* the company furnishes these benefits.

Look over your own program for employee communication. Are you giving less thought, spending less time and money than the plant unions in promoting your own company to your employees? If the answer is yes, then you would do well to consider the nine-point suggestion program given below, to see whether your communication channels to employees are being fully utilized. If not, then you are wasting a valuable asset in labor relations.

Nine Positive Points

Here are a number of ways to open up these communication channels and keep them open:

1) Informal oral discussions at time employee is hired.
2) Theme repeated in company publications, bulletins, posters, etc.
3) Brief your supervisors so they can answer employees' questions on all fringe benefits.
4) Acquaint supervisors on proper methods of administering each benefit as problems arise with individual employees.
5) Create a favorable attitude toward benefits

in handling of employee records, vacation scheduling, sick leave eligibility, and a hundred other opportunities that occur in daily contact with employees.

6) Tell job applicants what fringe benefits are offered as well as the salary offered.
7) Prepare and issue to new employees an employee handbook which answers many questions about the company and its fringe benefits.
8) Periodically mail to the homes of each employee a detailed statement showing how much vacation, sick leave, health insurance, pension, and profit-sharing equity the employee has accrued in the company. One company calls their pamphlet "Your Investment in Personal Security," and puts a dollar-and-cents value on the extra benefits afforded by the company each year.
9) Notify each employee whenever his eligibility increases for more vacation, more sick leaves, and more of the other fringe benefits. These are constant reminders that prevent fringe benefits from being taken for granted. They pay dividends in appreciation and in control of employee fringe benefit abuses.

The more an employee realizes the extent of his own personal investment in a company the less likely he is to be swayed into taking his skills elsewhere . . . and the more apt he is to look with respect on his company. "You treat me right, and I'll treat you right" is apt in this respect.

You can make your fringe benefits work for you as a means of getting and keeping good employees. Your fringe benefits can identify your company as a "good place to work," and as a "progressive" company . . . an asset to the community. ■

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*Flexitallic is a registered trade name. No one else can make a Flexitallic Gasket. Look for *Flexitallic Blue*—it's our exclusive blue-dyed Canadian asbestos filler.

Check 3360 opposite last page.

When U. S. Rubber was planning its new research center in Wayne Township, N. J. — primarily a residential area — it was imperative that laboratory wastes be handled in such a manner as to remove any possible objection from neighbors or the New Jersey Department of Health.
Of the four types of waste encountered, here's how the most troublesome and difficult one was treated.

Submerged combustion p

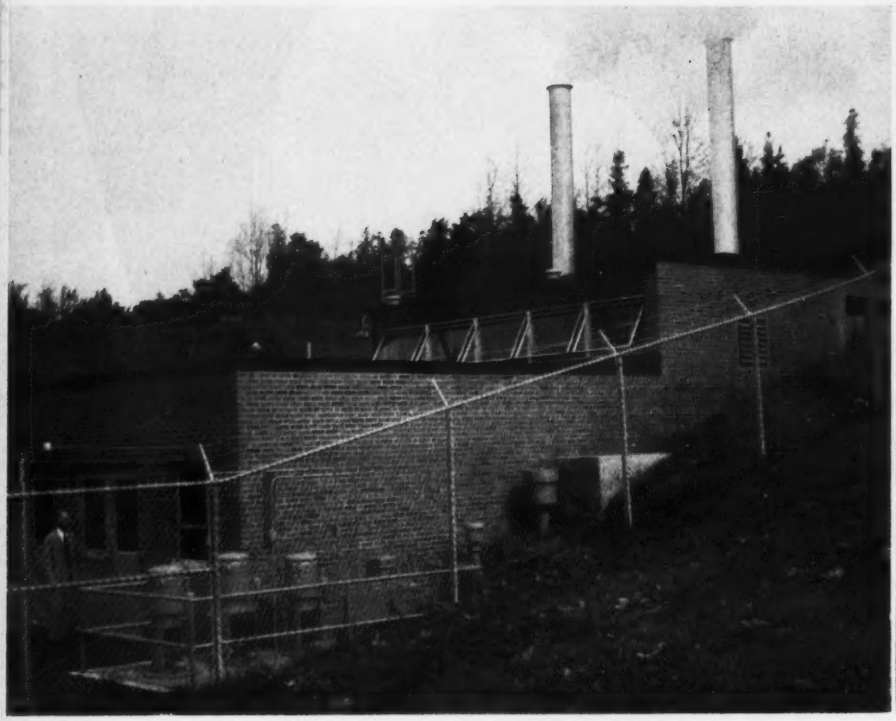


Fig 1—Waste treatment plant of new U. S. Rubber research center

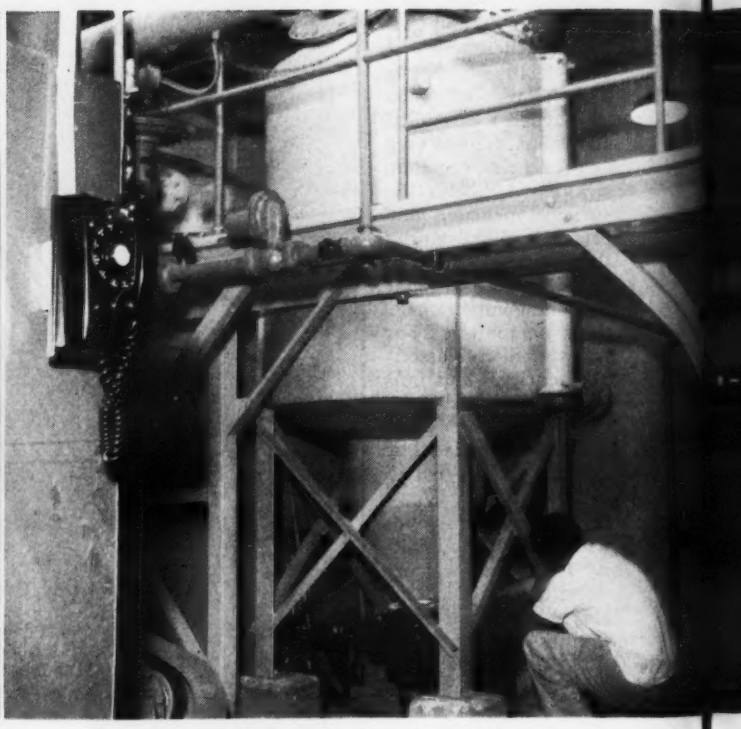


Fig 2—One of the two 500-gal vessels containing the submerged combustion burner

GORDON WEYERMULLER, Associate Editor
With **DR. JOHN A. DAVISON**
Mgr. Chemical Eng. Research
United States Rubber Company
Wayne Township, New Jersey

PROBLEM: When the new research center of U. S. Rubber was being planned, it was necessary that strict control of all wastes be maintained to overcome possible objections from neighbors and meet requirements of the state. Community was very conscious of possible air or stream pollution.

An early survey indicated that the effluent might be divided into four main categories:

1—Cooling water
2—Sanitary
3—Chemical
4—Polymer

Cooling water could be kept clean without too much difficulty, and a check made of its flow. Sanitary wastes could be treated in the conventional manner, the same as domestic sewage. Chemical wastes could be treated by stripping out volatile materials, oxidizing by aeration and retention, and treatment with chlorine.

It was the polymer wastes — consisting of suspended synthetic rubber particles, organic solvents, inorganic salts, and synthetic detergents — that presented the most formidable problem.

Daily volume of material was extremely erratic. Chemical and physical characteristics were just as variable.

Extensive laboratory work indicated that the polymer waste might be satisfactorily handled by chemical methods. However, due to the extremely variable volume and character of the waste, it was concluded that this type of treatment would be difficult. Also, it might prove expensive and troublesome because of the strict standards that had to be met.

Solution: An alternative and more dependable plan — consisting of simply evaporating most of the water and volatile components from the polymer waste by submerged combustion, and

n prevents polymer-waste problem

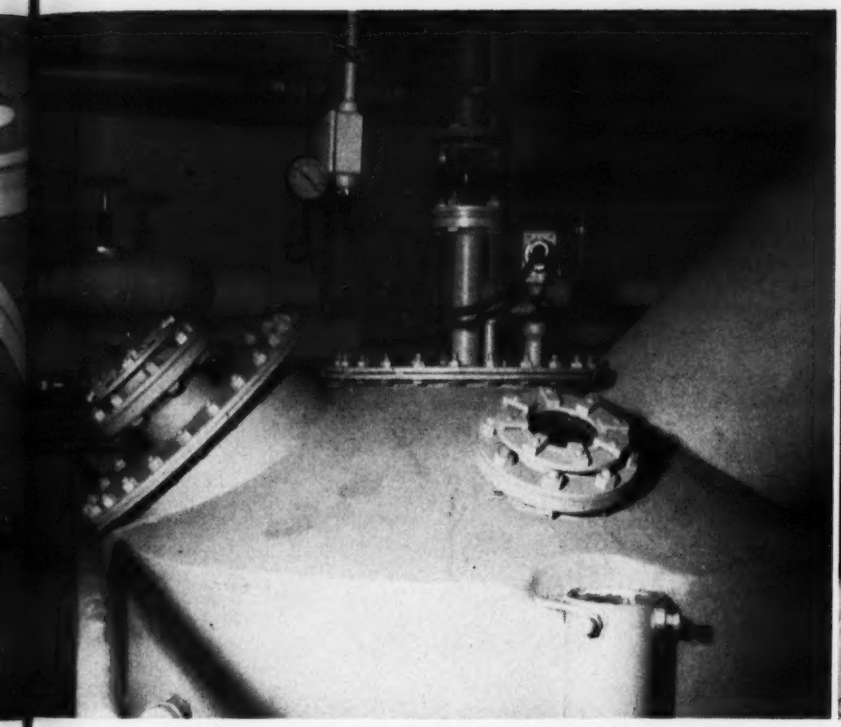
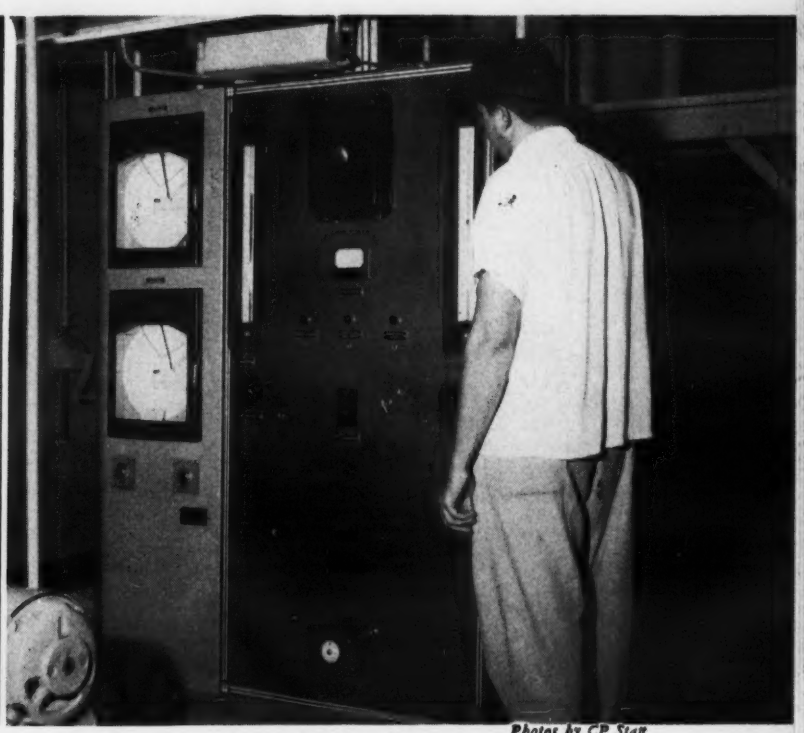


Fig 3—Top of one submerged combustion unit. Natural gas and air enter through pipe in center



Photos by CP Staff

Fig 4—One of the two control panels. Burner control system furnishes completely safe operation

disposing of the sludge by carting it away — was considered. Composite samples of the polymer waste were sent to a manufacturer of submerged combustion equipment for trial treatment by this method. Typical results obtained from these submerged combustion tests follow:

Test	1	2
Wt of charge, lb	200	293
Fuel gas rate, cfm	2.6	1.6
Air rate, cfm	30.5	17.8
Duration of test, min	105	236
Evap temp, °F	198	194
Water evap, lb	179	270
Sludge produced, lb	41	23
Gas consumed, cu ft	273	377

Test results being favorable, the submerged combustion method was selected for processing the polymer wastes. Sewage treatment plant, capable of handling all four types of wastes produced, was placed in operation March 1, 1957 (Fig 1).

Polymer waste is expected to attain a maximum of 1400 gallons per day of material containing 1-2% solids. Waste is first collected in an equalization basin where it is retained for about 24 hr. Then, 350-gal batches pass to one or both of the 500-gal glass-lined tanks (Fig 2), each of which contains a submerged combustion burner.

Natural gas and air flow through pipe entering top of vessel (Fig 3), and come together at bottom where they burn beneath the surface of the liquid. (Note electrical connection, for igniting burner, on top of vessel in Fig 3.)

Fig 4 shows one of the twin control panels used for the submerged combustion equipment. Fyr-Eye control system utilizes a flame-sensitive cell which shuts off fuel in two to four seconds after burner goes out, eliminating explosion hazard. Control unit provides for automatic startup, operation, and shutdown. Fail-safe circuit prevents operation under any unsafe condition.

It was anticipated that waste latex, which contains soap, might foul the submerged combustion equipment. This has not happened. Foaming, which sometimes occurs, is combated by starting the burners with the tanks partly full, then adding the remainder of the 350-gal batch after boiling has commenced. Defoamers have not been uniformly successful.

Polymer waste material is evaporated to about 10% of its volume. Additional waste is added and evaporation is continued. About 700 gal is evaporated

To bottom page 48

CAMWHITE
JOHNS-MANVILLE
JOHNS-MANVILLE

Due to handling heavy, viscous materials that overloaded mixer up to 200%, gears and bearings in transmission had to be replaced every three months. Then, dry fluid drive was installed which —

Stops mixer breakdowns, saves plant $1230 in one year

GORDON WEYERMULLER, Associate Editor
With **EARL B. JACKSON,** Plant & Production Engineer
Products Research Company, Los Angeles, California

Problem: Constant overloading broke down drive on mixer in use at Products Research Company four or five times a year — with consequent loss in production and expensive repairs. It was not anticipated that such a heavy load would be placed on mixer when it was originally acquired.

Products Research manufactures gasketing, tapes, sealing compounds, and other materials. This particular mixer is used to mix plant's heaviest and most viscous product on a 24-hr schedule. One type of this material is used as a fuel-tank sealant on jet fighter aircraft.

Since batches vary widely in viscosity, much of the time mixer was operated at a 200% overload. Frequent shock loads also resulted. These heavy batches had to be mixed continuously for long periods.

Mixer was driven by a 25-hp electric motor, connected to a four-speed transmission by V-belts and sheaves. Output shaft of transmission was connected directly to drive shaft of mixer. Overloading made it difficult to keep gears and bearings in the transmission, and couplings in the drive line. In fact, gears and bearings had to be replaced every three months.

◀ Batch of aircraft sealant being made up at Products Research. Arrow indicates dry fluid drive which enables mixer to handle extremely heavy loads without downtime or excessive maintenance

Solution: During the summer of 1956, a dry fluid drive, known as a Flexidyne, was installed on the mixer. This unit is designed especially to take overloads and shock loads.

Rotor of dry fluid drive is free to turn concentrically inside housing. Fine particles of spherical steel shot, called the "flow charge," are between rotor and housing. This flow charge, which acts very much like a fluid, is the medium that transmits power from the housing to the rotor. Quantity of steel shot can be varied to change torque capacity.

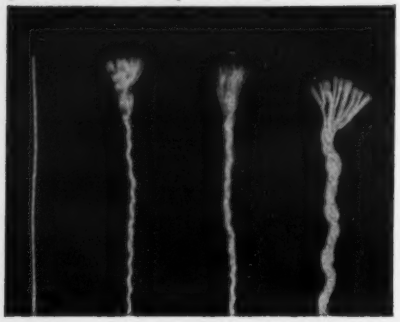
Accurate overload protection is assured since the drive can be set to slip anywhere from 30% over the required starting torque to as high as peak motor torque. During starting and overload periods, the current drawn is at a minimum because with the standard drive setting the motor is never pulled down to less than 90% of synchronous speed.

Hence, in case of overload, before damage is caused, rotor slips relative to housing, overcoming friction and wedging action of flow charge. Thermal switch, which automatically cuts electircal load if overload persists, is available.

Results: It has been impossible to overload or shock load the mixer or drive since installation of the dry fluid drive on the motor drive shaft. Mixer was only out of service once during the first year after installation of the new

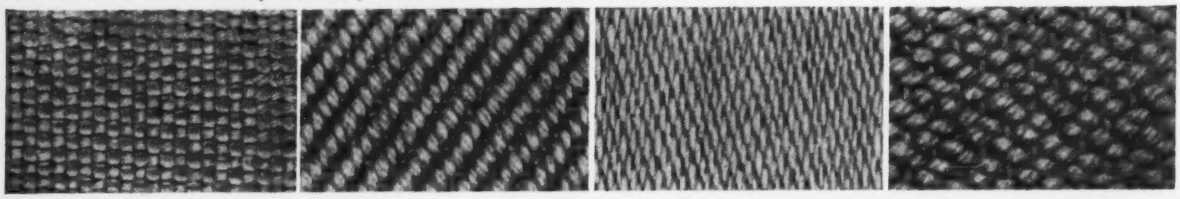
Test your FILTER FABRIC KNOWLEDGE here!

1. Yarns are the basis of fabric construction. Yarns shown here are plied, spun single, monofilament, multifilament. Can you match them up correctly?

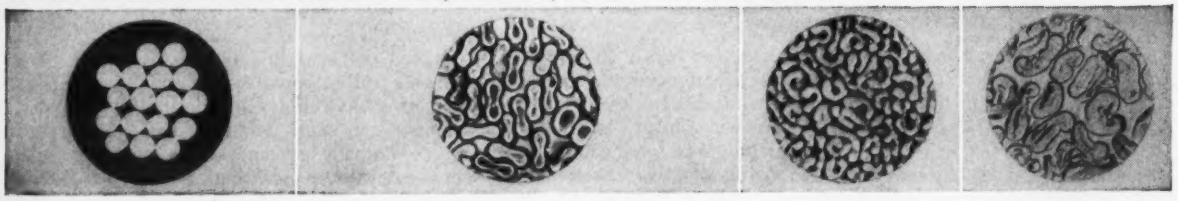


Processing engineers have to know many things, but they don't necessarily have to be filter fabric experts. Not when they can rely on Wellington Sears and the specialists who distribute our filter fabrics. This little test will help you check your knowledge of some basic fabric facts. It will also serve to remind you of the help always available through Wellington Sears. For more information write for "Filter Fabric Facts," Dept. M-2, Wellington Sears Co., 65 Worth St., New York 13.

2. Weaves are just one factor affecting filter fabric performance. Here are three basic weaves, satin, twill, and plain, plus one variation, chain cloth. Can you identify all of them?



3. These are cross-sections of Orlon*, cotton, dynel, and nylon fibers. Which are which?



Turn upside down for answers

3. a. nylon, b. Orlon, c. dynel, d. cotton
2. a. plain, b. twill, c. satin, d. chain
1. a. monofilament, b. multifilament, c. spun single, d. plied

*DuPont's trade mark for its Acrylic fiber.

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Check 3361 opposite last page.

Dry Fluid Drive

From preceding page

drive — as compared to four or five times a year previously. Reduced repair during this first year with the dry fluid drive has saved company $555 in maintenance costs and $675 in machine downtime. This combined saving of $1230 is equal to more than three times the cost of the drive. Some savings in electrical power have also been made.

(Flexidyne dry fluid drive is product of Dodge Mfg. Corp., Mishawaka, Ind.)

Check 3362 opposite last page.

Submerged Combustion

From page 45

in a unit during an eight-hour day. Resulting slurry is withdrawn at the end of each day's operation and emptied to a drying bed. Dried material is carted away.

Results: Submerged combustion unit has handled the polymer waste satisfactorily since it was placed in operation last March. Community relations of the U. S. Rubber research center have been excellent. Volatile organic compounds in polymer waste — alcohol and amines — are oxidized or burned so that no odor can be detected in surrounding area. Continued operation of the chemical engineering laboratory is dependent on the operation of the submerged combustion polymer-waste disposal-unit without a breakdown.

At a large synthetic fiber manufacturing plant in the Southeast, a similar submerged combustion setup is being used to strip volatile organic matter from a waste stream, thereby reducing the BOD content of the waste water.

(Submerged combustion units are product of Ozark-Mahoning Company, Tulsa 1, Okla.)

Check 3363 opposite last page.

(Fyr-Eye flame control system is product of Electronics Corp. of America, Combustion Control Div., One Memorial Drive, Cambridge 42, Mass.)

Check 3363A opposite last pg.

PITFALLS of industrial marketing research

DR. ALBERT D. FREIBERG
First Vice President
The Psychological Corporation

In theory, marketing research is the same in the industrial as in the consumer field. In practice, however, industrial marketing research is years behind consumer research. The reasons are many: Mass movement of relatively simple consumer items lends itself more readily to scientific study; the problems in industrial markets are just as complex, if not more so, but available budgets for research are smaller; finally, competitive markets may be less fierce.

But this is changing. Slowly, perhaps, but nevertheless, changing.

First of all, we might define our subject. Marketing research consists of the use of scientific procedures to solve problems in the marketing of a company's products. Ultimate objective, of course, is to increase profits by increasing sales, by reducing marketing or distributing costs, or both.

Perhaps a slight elaboration of the above three-part definition is in order. The term "scientific procedures" or method means the organized use, under known and recorded conditions, of historical, analytical, observational, or experimental procedures in testing hypotheses. This includes careful analysis of the problem, usually dependent on statistical analysis.

"To solve problems" implies a matter of major concern, not the many day-to-day decisions which men in management make, based on judgment tempered by experience. "Problems" implies an important policy or operating decision for which *no adequate* experience is available. Or there may be several executives who have solutions, each different, and each based on their own *adequate* experience. This is certainly the time for marketing research!

Now we come to the third part of the definition, "the marketing of a company's products." This includes all activities involved in getting products from the manufacturer to the consumer. Among these are such activities as warehousing, inventory control, definition of sales territories, sales quotas, and advertising of all kinds. Approximately two-thirds of the consumer cost of a product is marketing cost. This should impress on us the profit potential of marketing research.

Yet the very nature of market research data creates pitfalls all along the way. As with any numbers, market data have a feeling of accuracy about them, whether they are right or wrong. Our purpose here is to point out some of those pitfalls and suggest ways of avoiding them.

Several months ago the buyer of the furniture department of a nationwide mail-order chain operation came to us for help. After the usual "background" discussion, the buyer stated flatly that the return rate of furniture had been going up slowly but steadily during the past five years, and asked if we could do some depth interviews which would reveal the reasons for this increase.

This "alarming" increase in rate of return was particularly puzzling because *workmanship, materials,* and *styling* are better today than five years ago. Since there were no *real* reasons for this increase in the rate of return, there must be *psychological* reasons; our client said, "That's the reason, Dr. Freiberg, we've come to you for help. Is this the sort of problem you can help us with? How much would it cost to make one-hundred depth interviews with persons who have recently returned a piece of furniture?"

At my request we set up a second meeting with the sales manager and took a first look at the actual sales records and returns over the past five years:

- by style or type of furniture (modern vs conventional, etc.)
- by price of items (five grouping of price)
- by popularity of the item

A quick analysis showed — 1) returns were higher *only* on new modern styles of furniture. which were 2) higher priced, and 3) which had been added to the line during the past five years. Although this represented only 20 percent of the sales, it accounted for 50 percent of the returns. *There had been no increase* in returns on the kind of furniture sold five years ago!

Avoid the pitfall of mis-stating the problem! Don't assume that the client knows what the problem is or how to solve it. If he were that competent, he conceivably might have avoided the whole problem.

Several years ago we made a study in the plastics field . . . the primary purpose was to predict the approximate volume of basic plastic materials for the following one, two, and three years. In the process of analyzing and writing up our findings, we discovered that our interviewers had missed two of the five largest fabricators of laminated products. When the results of these two fabricators were included, our expected demand increased 12 percent — thousands of tons of raw material.

Avoid the pitfall of unrepresentative sampling. Be sure your sample represents the universe to be studied.

Many years ago a client asked us to determine the attitude of electrical distributors to a new line of products being introduced simultaneously by three manufacturers. As a first step, we sent

To next page

DR. FREIBERG was graduated from North Central College in 1926. He received his PhD from Cornell in 1936, and has taught psychology at Michigan State College.

He joined the Psychological Corporation in 1935 and was successively Technical Director of the Marketing and Social Research Division, Secretary of the Corporation, Vice President, and is now First Vice President.

Dr. Freiberg is listed in "Who's Who" and "Men of Science". He is a member of numerous scientific and professional organizations, including the American Psychological Association and Sigma Xi.

He is a diplomat in Industrial Psychology of the American Board of Examiners in Professional Psychology.

He is a past president of the Market Research Council of New York, and a former Chairman of the Applied Social Psychology Division of the New York State Psychological Association.

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Check 3364 opposite last page.

Market Research

From preceding page

two interviewers to call personally on a small number of distributors. It happened to be inventory time, and although our interviewers were able to get the desired information, a great deal of time was wasted in waiting for appointments, and some distributors were too busy to be interviewed at all. The cost per interview was staggering.

We then tried telephoning — and soon discovered that a few minutes on the 'phone were worth hours of personal calls. A person-to-person long-distance call to North Carolina or Ohio turned out to be flattering and important to the distributor, who gave us his immediate and undivided attention.

The results were most satisfactory, and not nearly as expensive as personal calls.

Avoid the pitfall of being afraid to try a new or different way of gathering your information, especially if the conventional methods aren't working well.

Not long ago we were given the assignment of finding out how good a job a distributor of photographic equipment was doing in his sales territory. Several days of direct questioning of dealers served by this distributor, produced results obviously of little value —most of the dealers clammed up, others had pet peeves, others were only curious about our reason for asking. All in all, this produced very unrealistic data on which to make an evaluation.

Then we tried another approach. Our man entered the store, showed his business card, and then told the dealer we were making a study for an old reliable company that was about to enter the photographic field for the first time. Our assignment was to find out, from the point of view of giving the best service to the dealer, whether the company should sell direct or through distributors. Now the dealers talked freely. They anticipated handling this new line; also, they were pleased and flattered to be asked their opin-

To page 63

Airco's Gunther and Hill: "'Broadening the base' prime factor in continuing growth"

Aggressive and up-to-date management techniques are becoming more and more important to today's chemical industry. Here's a CHEMICAL BUSINESS report on what they have meant to . . .

Air Reduction: Growth Company In A Growth Industry

A "growth company" has been defined as one growing at a rate greater than the average of other companies in the field — and giving every indication of continuing to do so into the indefinite future. Of course, this concept may be nebulous in some cases but it can be quite clear in others. A case in point: Air Reduction.

While the chemical industry has been growing at a rate of something like seven percent annually over the past few years, Airco has had an average growth (in net sales) of just under ten percent. And while the industry has had a 122 percent sales increase since 1946, Airco has boosted its net sales from $71 million in 1946 to approximately $187 million in 1957 — a strapping 164 percent increase.

While the growth of the company is partly a result of a healthy business climate generally and the booming postwar metalworking industry particularly (more than half of Airco's production is in industrial gases and welding and cutting equipment), it also reflects considerable diversification instituted by a management group that stands out as positive-thinking in a business noted for positive-thinking people.

Airco President **John Hill**

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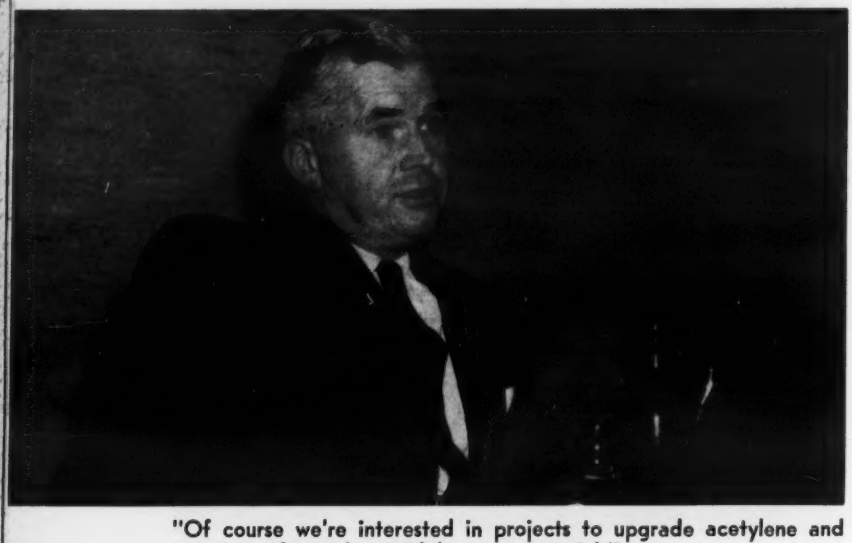
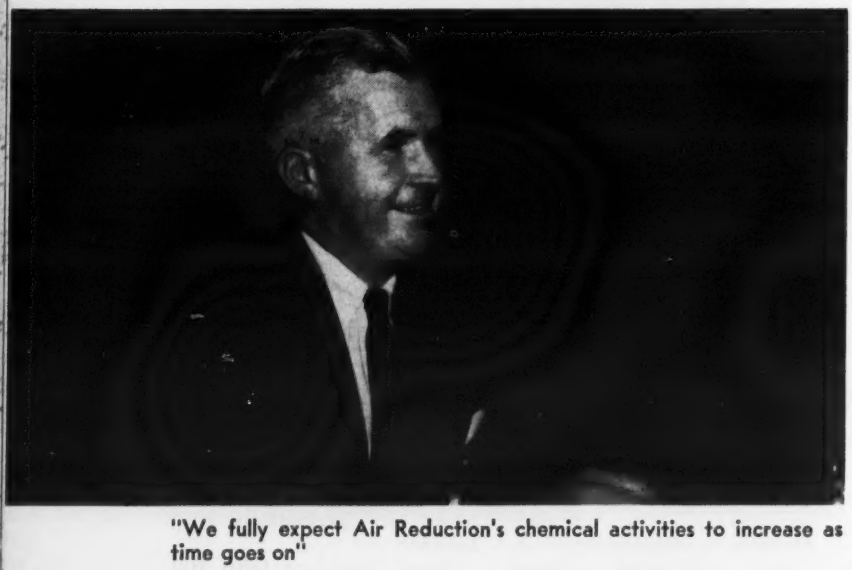
Airco: Growth Company

Airco's v-p Jack Gunther: "Certainly Airco won't limit itself to products based only on acetylene. We'll produce any material that looks good to us"



"Of course we're interested in projects to upgrade acetylene and reactions of acetylene with low-cost materials"



"We fully expect Air Reduction's chemical activities to increase as time goes on"

describes the expansion as "broadening the base." Long a leader in the industrial gas field, the company is being more and more identified with the chemical industry. Today, chemical products account for about 21 percent of the company's total business — and Airco management fully expects the chemical share to grow in percentage. Sales of industrial gases to chemical producers provide an additional Airco link to the chemical industry.

It's a pretty good bet that Airco's future diversifications will be the thing to watch. V-p **Jack Gunther,** in charge of Airco's chemical activities, explains the company's feeling toward further diversification: "Certainly we're interested in finding new products that stem from our present lines, but we don't limit ourselves to products based on acetylene alone. While a major part of our current effort is to diversify in logical directions from our present products, we will also be looking into fields that aren't related to our current production. We'll produce any material that looks good to us."

Air Reduction's chemical business dates from the early Nineteen Fifities. In 1951, the company's board of directors voted $10 million for the construction of a calcium carbide and acetylene generating plant for Airco's National Carbide Company division at Calvert City, Kentucky. Before completion of this installation, $8 million more was appropriated to double the capacity of the plant which last year alone produced almost a third of a million tons of calcium carbide.

Unlike previous expansions in calcium carbide and acetylene, Calvert City was a planned venture into diversified organic chemicals. Almost 2000 acres of land were acquired and developed into sites for acetylene consuming plants to be built by both Airco and its customers. Although at the time construction of the Calvert City Carbide plant began there were no consuming plants authorized, there are now six different operations receiving acetylene by pipe-line and growth is continuing.

At the time that Air Reduction moved into Calvert City, the company organized a new division, the Air Reduction Chemical Company. Today, this division produces at its own plant at Calvert City an annual total of 30 million pounds of vinyl acetate monomer, an acetylene-based chemical used as an intermediate in the production of adhesives, paints and coatings. Next month the plant's capacity will be boosted to an annual 45 million pounds of monomer by an expansion now under way.

Two other Air Reduction Chemical Company units are now nearing completion at Calvert City: a methyl butynol-methyl pentynol operation and a vinyl stearate plant. Both new units will be the first US operations to make either product on a commercial basis.

Rounding out Airco's triumvirate of chemical divisions is Colton Chemical Company, acquired by Airco in 1954. An important producer in the field of synthetic resins derived from vinyl acetate monomer (supplied in this case by Air Reduction's own chemical company), Colton produces polyvinyl acetate emulsions, polyvinyl alcohols and copolymer emulsions at its plants at Cleveland, Ohio, and Elkton, Maryland.

At this point in the growth of the chemical industry it is hard to predict the position of any particular company a few years hence but it's a pretty sure bet that in the years to come Air Reduction will continue to be a growing influence in the chemical field.

As a "growth company," Air Reduction is well under way.

Demand, Capacity To Balance, Says Industry Survey

Although short-term prospects for the chemical industry will be reflecting the general economic lag for the next year or so, the long-term prospects still remain bright, according to the latest Value Line Investment Survey.

While some of the new capacity is expected to be partially idle for "the next year or so," the longer-term economic expansion will lift demand into line with capacity by the 1960's.

Citing the cause for today's overcapacity in chemicals, the Survey explains: "Market overevaluation is probably part of the reason but it is applicable only in a limited sense. Each company, with an eye to the future, is expanding individually. Chemical executives don't want to be 'caught short' again as they were in the early Fifties. A certain amount of overcapacity will be accepted to keep pace with the rest of the industry."

Although subscribing to the widely-held concensus that no economic advance can be expected until mid-1958 at the earliest, the Survey still indicates that the overcapacity will have no serious detrimental effect on the industry. This overcapacity, it further explains, is a result of three factors, 1) the heady optimism born of the post-war boom, 2) the availability of cash, and 3) inflation. Concerning the latter, it says: "The upward march of prices has never been more pronounced in American history. Most people tend to project this trend into the future. The only protection, they feel, against rising prices is the ownership of real property — in this case, plant facilities. The chemical executive reasons: 'If the plant is not built today, it will cost twice as much ten years from now.'"

In evaluating the future,

To page 57

Harshaw

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CP Marketing

When Pfizer found a couple of years ago that it needed an accelerated commercial development to keep pace with its newly developed products, its answer was the "Product-of-the-month." Here's how the program has created . . .

New Markets For New Products

By ALLAN J. GREENE
Administrative Vice President
Chas. Pfizer & Co., Inc.

In 1955, the Research, Chemical Sales and Commercial Development Divisions of Chas. Pfizer launched a "new chemical product" program. This program, which can now be viewed in retrospect, was conceived to accelerate, systemize and coordinate the new product development programs within the research, production, sales, and commercial development groups. In its first phase, the program introduced thirteen new product candidates within a twelve-month period.*

After the first phase of the program, a "breather" was taken, and the next year was devoted to the evaluation of these materials. This "breather" period was extremely helpful in adjusting to the conditions imposed by the heavy product accumulation: assessing the results to each product introduction, providing for the vast amount of customer service necessarily involved, and coordinating all of the activities necessary for successful commercial efforts.

The total number of samples requests for these new products, and for the older "Citroflex" family from 1955 to date, exceeds ten thousand and the value of customer evaluations is in millions of dollars.

Here are some "case histories" of the new products. Two of the group, Citroflex A-4 and A-2, have grown to be tank-car or carload products, and four others are being shipped in drum lots. (Citroflex A-8, itaconic acid, kojic acid and methyl vinyl ketone). Citroflex 2, 4, A-2, and A-4 were being shipped

*Itaconic acid, dimethyl itaconate, dibutyl itaconate, monoallyl itaconate, diallyl itaconate, acetyl-tri-2-ethylhexyl citrate (Citroflex A-8), acetonedicarboxylic acid, dimethylacetonedicarboxylate, triallyl citrate, kojic acid, chlorokojic acid, kojyl palmitate and methyl vinyl ketone.

in drum lots prior to this program.

Current sales of itaconic acid are at a rate of several hundred thousands of pounds per year, and growing steadily.

In the early 1880's Max Klinger, the German artist, sought a clear solid material as a new art form to represent water for a proposed statue. On the suggestion of Richard Anschutz, a chemist, Klinger urged the manufacture of a clear polymer material from itaconic acid to provide his water-simulating substance. This may well have been the first suggested practical use for itaconic — almost thirty years before the advent of the plastics industry.

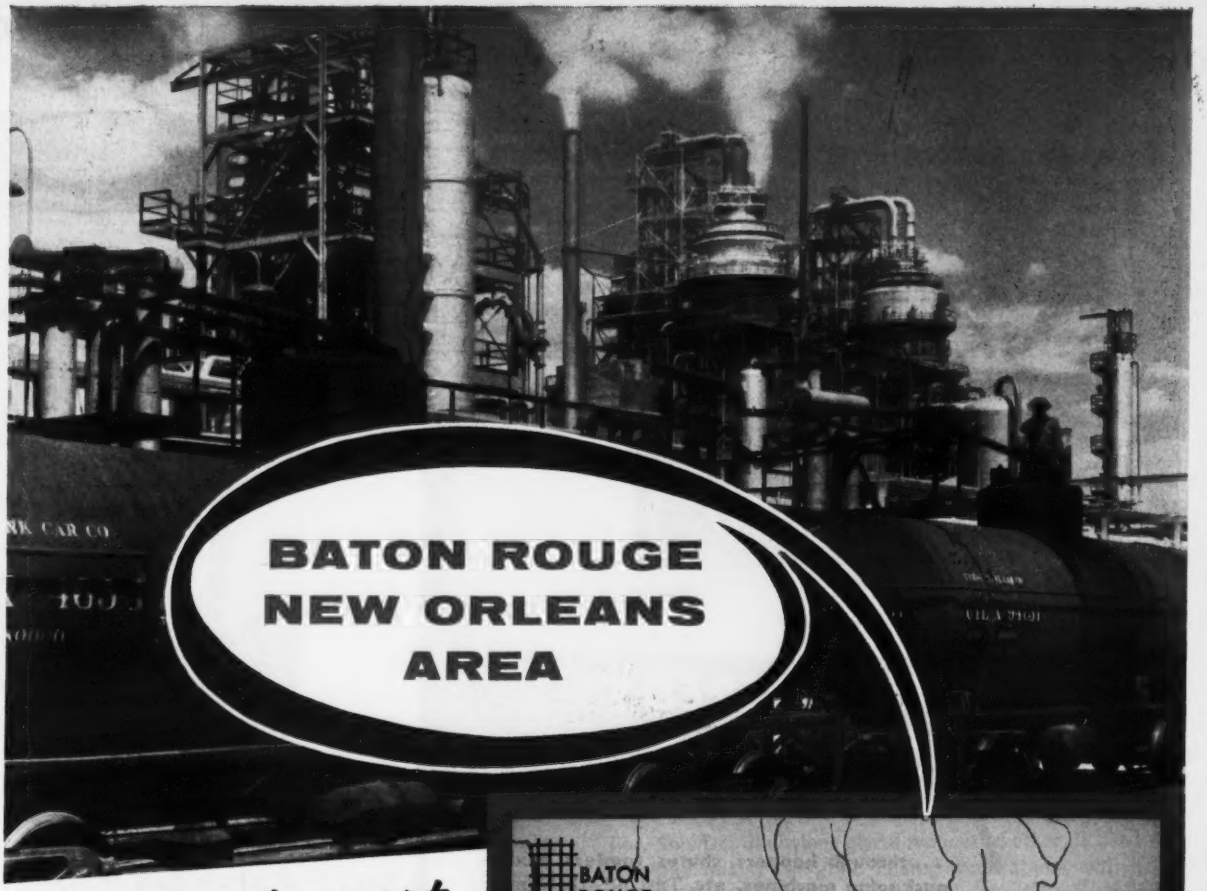
Today, Max Klinger's vision has become a reality, for one of the uses of itaconic acid is as a co-monomer for acrylate plastics, used as art or architectural media. Other important applications include its use as a monomer in polyester resins, synthetic fibers and vinylidene chloride surface coatings. Promising new uses include urethane foams and rubbers, and agricultural insecticides.

Many of these applications were suggested in early patent literature; but they remained in the laboratory until recently, because itaconic was not available in sufficient quantities for commercial use.

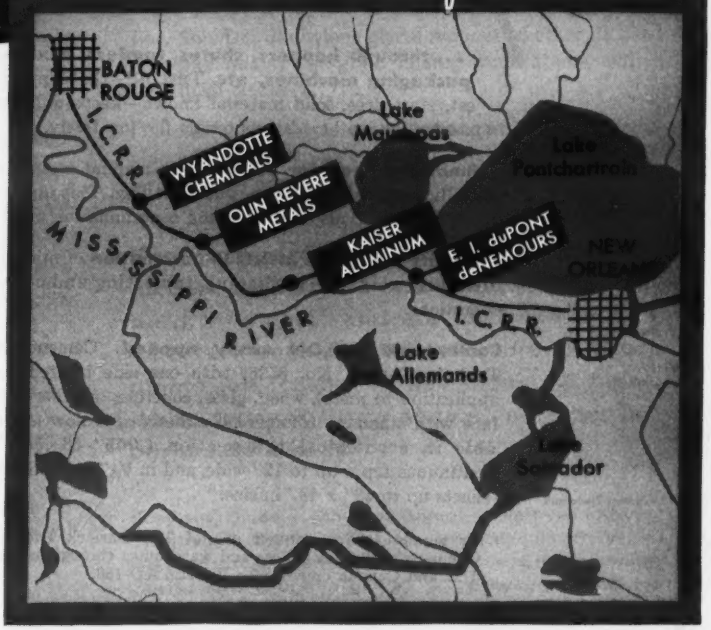
Some citric ester plasticizers had been commercially available for several years, but their sales received a sharp impetus when tighter specifications were adopted, when they were given a trade-mark, Citroflex, and technical service was strengthened — all offshoots of the new product program.

Citroflex A-4 has become the most important member of this family with annual sales of several million pounds. Its major uses have been in the food packaging field. Because of its toxico-

To page 58



...fertile environment for the growing chemical industry



New plants are going up along the Mississippi River between Baton Rouge and New Orleans. In 1956, the area gained approximately $222 million in industrial projects.

Executives of companies moving into this area give the same reasons for choosing it—facilities for deep sea vessels, excellent rail transportation, abundant natural gas, electric power, and fresh water. Also petroleum, sulphur and other basic raw materials.

Perhaps the Baton Rouge-New Orleans area suits your industry. Many good plant sites may be obtained at a fair price. For full particulars contact J. S. Frost, Illinois Central Railroad, 135 East 11th Place, Chicago. Your inquiries will be held in the strictest confidence.

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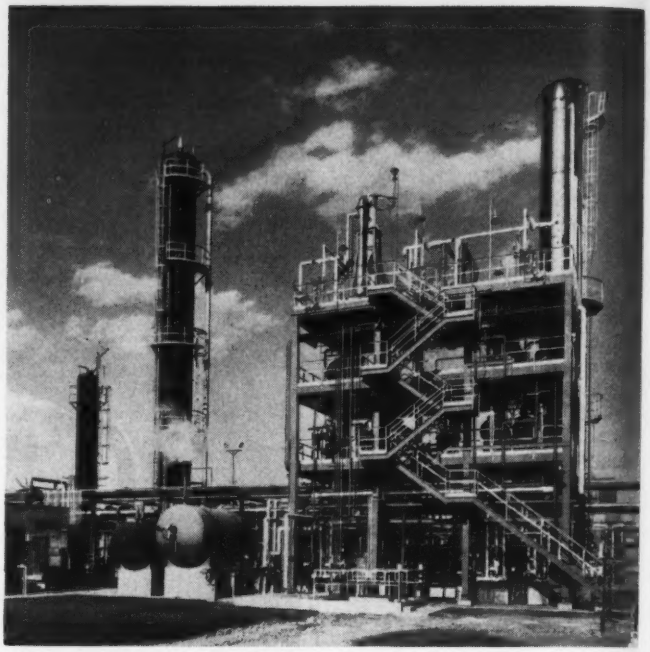
cp Our Growing Industry



Vacuum distillation unit at right comprises the final purification step in the Celanese production of trimethylolpropane

Celanese Trimethylolpropane Unit On Stream

Celanese has begun operation of its trimethylolpropane unit at its Bishop, Texas, plant. Before coming on stream with the new facility, the company had been servicing customers with the output of a large-scale semi-works plant. The new production unit has a capacity of over 10 million pounds annually.

The chemical is used primarily in the production of polyurethane foams, although it finds use in such products as polyurethane coatings and alkyd resins.

The unit is also designed for the production of anhydro enneaheptitol, trimethylolethane, neopentylglycol, and other aldol products.

Pittsburgh Plate Glass Plans Fiber Plant

Pittsburgh Plate Glass has released plans to construct a multi-million dollar glass fiber yarn operation at Shelby, North Carolina. The plant will employ about 850 people when completed.

The new unit will produce glass fiber products for paper and plastic reinforcement, as well as for industrial and decorative fabrics.

Capacity of the 16 operating furnaces will be on the order of 25 million annual pounds of yarn.

First US Glacial Acrylic Acid Plant Nears Completion

The first US facility for the production of commercial quantities of glacial acrylic acid is nearing completion at the Goodrich Chemical plant in Calvert City, Ky. The operation, expected to be completed early this year, will have a capacity of

several million annual pounds of the material.

The new plant will be integrated for the production of acrylic resins as well as the acid. Related chemicals to be produced include additives for pharmaceuticals, cosmetics, and latex paint formulations.

The acrylic plant is the third unit of the Goodrich Chemical development at Calvert City.

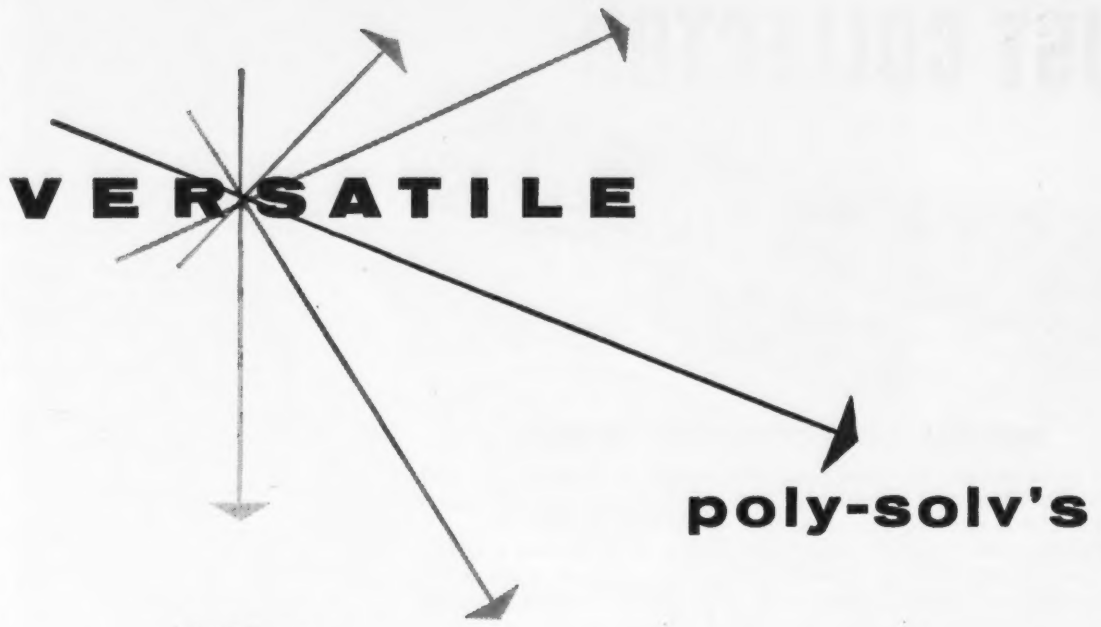
Demand / Capacity

From page 53

the report continues: "Has the combination of optimism, ready cash and inflationary thinking led the chemical industry into a perilous position from which it cannot recover? Not unless the economy stops growing. The plant constructed recently may be partially idle for a year or two but demand will probably catch up with current capacity in time. Chemical production has expanded twice as rapidly as other industrial output in the past decade. This relationship will probably hold well into the future."

Copies of the report are available from The Value Line Investment Survey, Arnold Bernhard & Co., 5 East 44th St., New York 17, N. Y., or by checking 3369 opposite last page.

"I don't like the way you're running things . . ."



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Poly-Solv EB, **ethylene glycol monobutyl ether,** is a solvent for lacquers; it strengthens blush resistance, improves flowout, levelling and gloss.

Poly-Solv DM, **diethylene glycol monomethyl ether,** is used in brake fluids, brushing lacquers, spirit-type stamp-pad ink dyes and textile dye pastes.

Poly-Solv DE, **diethylene glycol monoethyl ether,** is used in brake fluids, non-grain raising wood stains and in industrial cleaners.

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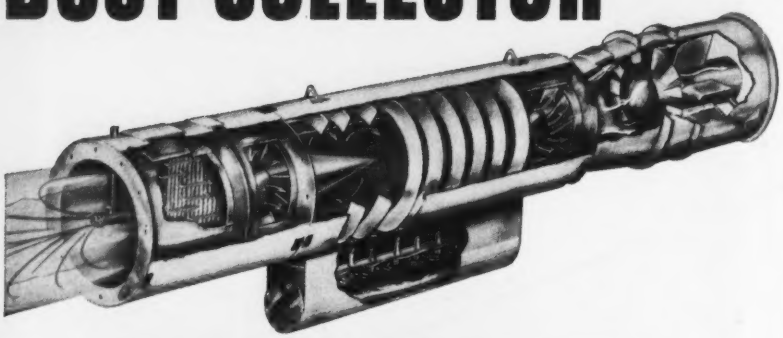
NEW PROVED JOY-MICRODYNE DUST COLLECTOR

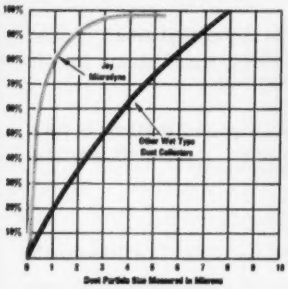


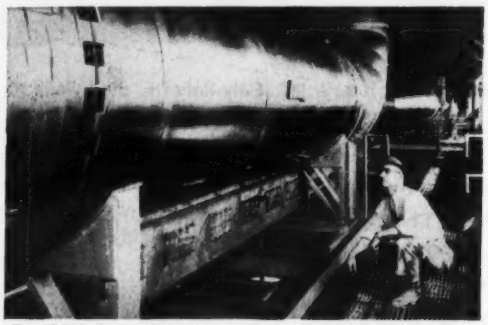
PROFILE OF A PROBLEM SOLVER

Here is an in-duct "educated pipe" that laughs at space, weight and water limitations as it collects over 99% of dust 5 microns and larger; 92% of 2-micron dust, and substantial amounts of smaller dust.

Particles enter through water-saturated air, slam against a water-film-covered impingement element, encase themselves in water droplets as they pass through, then whirl and collect on the sides of the middle section, to finally drain into a sump. Cleaned air is straightened and thrust on its way by an integral Joy Axivane Fan.

Performance graph of actual installation shows efficiency of the Joy Microdyne Dust Collector. (A micron is 1/25,000 inch)





This 48,000 cfm installation shows space economy of in-duct placement.

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Check 3371 opposite last page.

Pfizer

From page 55

logical safety, it has been accepted by the Food & Drug Administration for use in films for food and beverage containers, and as a component of plastic meat wraps by the Bureau of Animal Industry, and the Office of the Quartermaster General.

Citroflex A-2 has found an important new use in a defense application. Citroflex A-8 has been of special interest with vinylidene chloride polymers.

Acetonedicarbonxylic acid attracted more interest from research chemists than any of the other new product candidates, but later was superceded by the dimethyl ester which is more stable and lower in cost. One of the most important uses for the latter is as an intermediate for a new agricultural chemical.

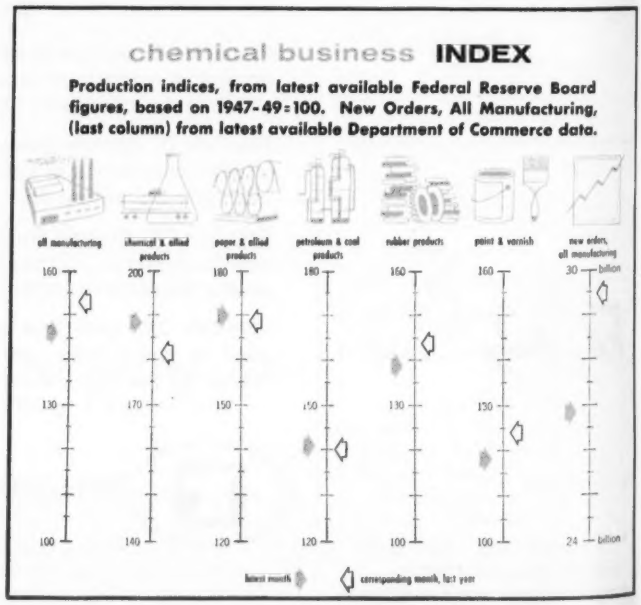
One of the new uses that has developed for kojic acid is as an intermediate for a new and efficient agricultural insecticide. There is much continuing research interest in this class of materials. Some dyes prepared from this compound, for example, have been found to possess fastness to washing and light when used on cotton, silk, and wool. The fungicidal properties of certain metal chelates of chlorokojic acid, a kojic derivative, have suggested their use in agricultural disease control, as mildewcides and fungicides in paints, water treatment, paper processing, and textile finishing.

Kojyl palmitate, another derivative, has been found to have potential use in the removal of trace metals from nonaqueous media, such as petroleum oils and paint additives. The compound still retails its chelating properties in such systems.

Methyl vinyl ketone has found steady and important uses. Part of its commercial success has resulted from the development of a more stable product which can be stripped without hazard from spontaneous polymerization.

The 1958 Plans

Now Phase II of this program is in operation. These new materials have just been introduced: citraconic anhydride, methyl succinic anhydride and tributyl aconitate. The citraconic anhydride offering already has attracted more than four hundred sampling requests with special interest in its



use as an epoxy resin curing agent. Methyl succinic anhydride appears to be particularly effective in easing the problem of storage of epoxy formulations used in casting or laminating. With 1% dimethyl benzylmine catalyst added, for example, pot lives of about 190 hours were obtained with liquid epoxy resins and stoichiometric ratios of methyl succinic anhydride.

Tributyl aconitate imparts stability and flexibility to vinylidene chloride resins. It is also a plasticizer for polyvinyl acetate, ethyl cellulose, and other cellulose esters and ethers. Early testing shows that butadiene-styrene copolymers retain low-temperature flexibility when plasticized with tributyl aconitate.

Within the next few months, the commercial introductions will include a new product of direct fermentation, additional fermentation derivatives, and a series of alkylates and sulfonates from the pilot plant of the recently acquired Morton-Withers operations in Greensboro, N. C.

These new products and product candidates for the chemicals and plastics industries are becoming an important segment of the total Pfizer new product effort, which now includes pharmaceuticals, agricultural chemicals, amino acids, products for food spoilage prevention, and surfactants as well as intermediates and plasticizers.

"Oh yeah, smarty, . . . well let's hear you recite the logarithm tables."

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Electronic testing is just one of many fabricating and testing procedures used by Bridgeport to maintain its high standards of quality and workmanship and to give you better, more economical tube performance. It's in keeping with the requirements that must be met in today's increasingly critical operations.

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Check 3374 opposite last page.

CP Spotlight on people

Dr. Clyde Williams retires as president of Battelle Memorial Institute. Succeeding him is **Dr. B. D. Thomas.**

Sun Chemical elects **Eric N. Blackstead** new vice president of corporation and general manager of chemicals group.

Albert E. Cleghorn, recently appointed president of Allied Chemical's National Aniline Division, died suddenly of a heart attack. **Chester M. Brown** is named to take over the late Cleghorn's position. Brown will continue with his duties as Allied vice president.

Irb H. Fooshee is appointed president of General Chemical Division of Allied Chemical. Fooshee succeeds **Chester M. Brown** who was recently made a v-p of Allied. And at Allied's Solvay Process Division . . . **Wilbur H. Brumfield** and **Cortez P. Hackett** become vice presidents.

Fooshee

Donald G. Brower is elected vice president in charge of research at Victor Chemical.

New assistant general manager, commercial development division of American Cyanamid is **William D. Holland.**

Oronite Chemical announces election of **Norman E. Hathaway** as director and vice president-marketing. And **R. E. Echols** is named to newly created post of supervisor-product development.

Dr. W. E. Hanford is appointed vice president for research of Olin Mathieson.

Hanford

George T. Bayley, executive v-p of Calkin & Bayley, is elected chairman of firm's board of directors.

Collier Carbon and Chemical elects **W. L. Stewart Jr.** chairman of the board and **Robert T. Collier** president. Other officers elected include: **Homer Reed, William C. Kaesche, Robert S. Ray,** vice presidents; **Howard W. Wright,** secretary; **Paul Foreman,** assistant secretary; **Frank H. Dlouhy,** treasurer; **W. C. Van Siclen,** assistant treasurer; and **R. G. Greip,** comptroller.

Robert D. Goodall is appointed vice president of Davison Chemical Company, a division of W. R. Grace.

Goodall

Du Pont elects **Robert L. Hershey,** general manager of polychemicals department, to post of director, vice president, and member of the executive committee.

George C. Wells becomes president and **Tom R. Ragland** is made executive vice president of Union Carbide International, a division of Union Carbide. And at Union Carbide Chemicals Company, **John A. Field** fills newly created position of vice president-marketing. **Duncan B. Williams** is appointed general sales manager of Union Carbide Olefins Company.

Corn Product Refining elevates **Robert C. Wheeler** to newly created post of vice president for personnel and public relations and **Alfred S. Wells** to vice president for purchasing.

W. H. Bromley is appointed director of marketing for Shawinigan Resins Corporation. **E. H. Finsilver** succeeds Bromley in his former position as general sales manager.

Morton Salt promotes **R. A. Simpson** to post of general industrial sales manager.

Richard J. Hefler is elected vice president, finance, for American Potash & Chemical.

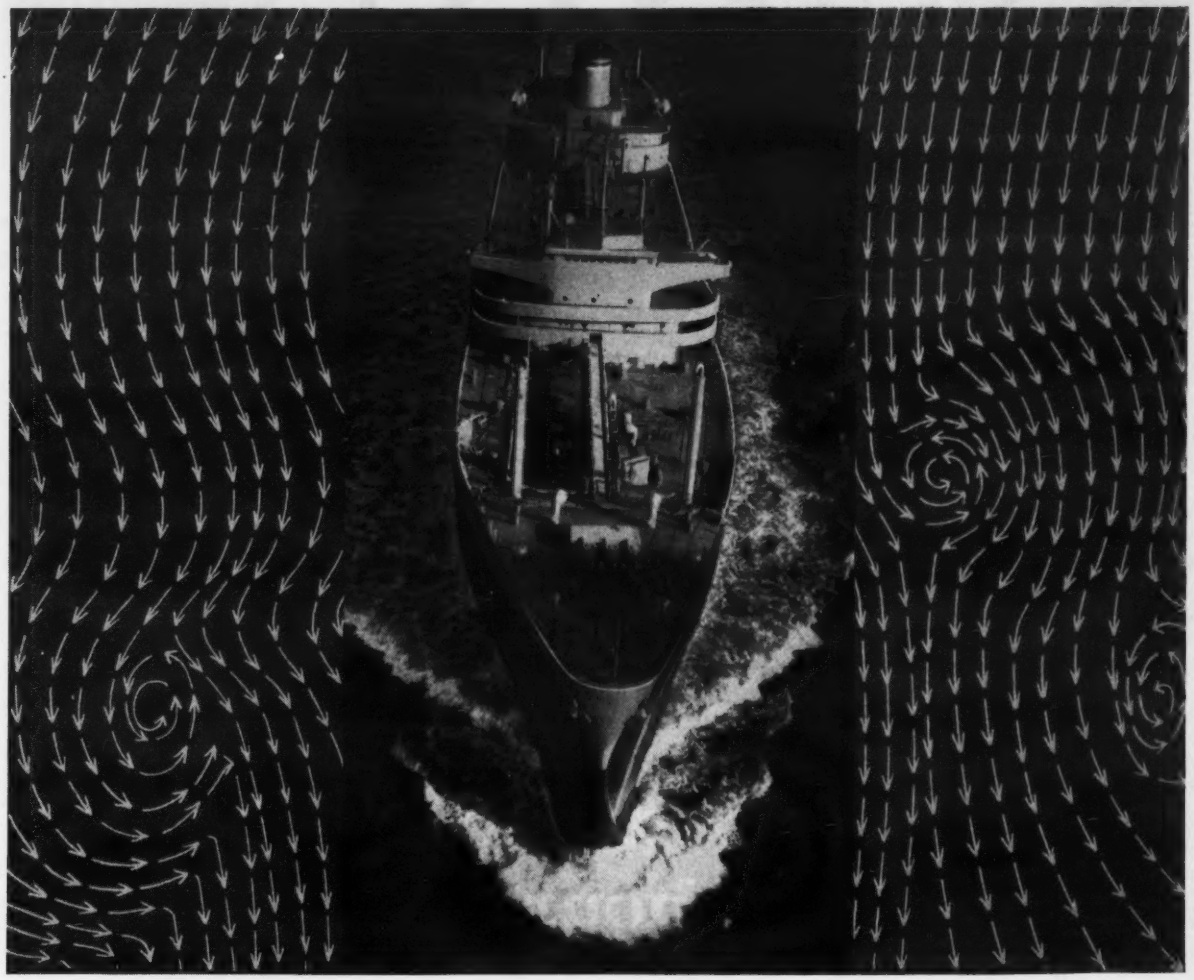
Henry L. Ford becomes a v-p and **W. Chamberlain Hale** an assistant v-p of Tennessee Eastman, division of Eastman Kodak. And at the company's Eastman Chemical Products Subsidiary . . . **Spencer E. Palmer** moves up to first vice presidency and **R. S. Leonard** will assume duties of assistant vice president. **R. L. Flanary** will take over Leonard's previous position of comptroller.

Dewey H. Nelson is new assistant manager of FMC's Becco Chemical Division. Nelson will also continue in the capacity of sales manager.

Grace Chemical Company Division of W. R. Grace appoints **Dr. J. D. Aughtry** manager of agricultural services.

C. J. Windsor is appointed to newly created post of vice president — manufacturing.

William G. Maguire and **Charles E. Main** are elected to the board of directors of National Distillers and Chemical Corporation.



HEADWAY...

She is "a ship of many firsts" . . . the USNS Maumee, which wore the blue-and-gold stack bands of the Military Sea Transportation Service as her five-bladed bronze propeller churned her toward her assignment in the Caribbean.

Of through longitudinal construction, the 25,000-ton T-5 tanker is the first ship of the MSTS long-range ship construction program; the first to be constructed from the keel up as a USNS ship. Her length, 620 feet; her beam, 83½ feet. She brings a capacity of 190,000 barrels to the task of delivering petroleum, oil and lubricants for the U.S. Armed Forces. She has an 18,000 mile range; a cruising speed of 18 knots.

Sun Ship is proud to have been given the task of constructing the modern Maumee, third ship of the name to serve the U.S. Navy. Two similar tankers, likewise named for American rivers—the Potomac and the Shoshone—have since been launched from Sun Ship ways and will join the Maumee in the important work of the Military Sea Transportation Service.

Sun

SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE SINCE 1916 **CHESTER, PA.**

Check 3373 opposite last page.

PAYLOADER®

PURCHASE AND
HOUGH
LEASE PLANS

"Unloads 65-ton box cars in 2 hours 10 minutes"

RIP-UP PACKED FERTILIZER with this handy scarifier teeth attachment now available for HA and HAH "PAYLOADER" models. Fertilizer packed on runways and floors is broken loose by reverse "PAYLOADER" travel. Teeth are hinge mounted on boom, easily removed when not needed.

We get "more production with less equipment" is the way M. J. Clement III, President of Merchants Fertilizer Company of Pensacola, Florida, sums up the situation. About a year ago his firm purchased 4 new "PAYLOADER" tractor-shovels (3 model HA's, 1 model HAH) to replace 7 older machines (4 HA's, 3 HAH's) destroyed in a plant fire.

As a result of this *forced equipment replacement*, Mr. Clement is counting these benefits: Efficiency increased almost 50% — same annual tonnage (30,000) handled with 4 machines in place of 7; Operating costs decreased — run and maintain only 4 units instead of 7.

To what does Mr. Clement attribute this fortunate condition? He says that the modern HA's roll-back bucket loads with less effort, delivers with less spillage and operates with lower maintenance. "With such operating efficiency, average unloading time for a 65-ton rail car has been reduced to 2 hours, 10 minutes on a 35-ft. haul."

On the basis of *greater production alone*, many plants have found that it pays them to replace older units with new "PAYLOADER" models. Without obligation, your nearby Hough Distributor will demonstrate *on your work*. Call him today!

THE FRANK G. HOUGH CO.
744 Sunnyside Ave., Libertyville, Ill.

Send PAYLOADER information on:
- ☐ HA (2,000 lb. carry) and HAH (3,000 lb. carry)
- ☐ Scarifiers for HA and HAH
- ☐ Larger models (up to 9,000 lb. carry cap.)

Name.....
Title.....
Company.....
Street.....
City..... State.....
2-A-1

Modern Materials Handling Equipment
THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Check 3375
opposite last page.

the OTHER Advantages of a Kinetic Seal

The obvious reason for choosing a LaBour Type G, the packingless self-priming centrifugal pump, is that it never has to be repacked. But there are other advantages resulting from the unique kinetic seal which should not be overlooked.

LaBour Type G is sealed by the *action* of a freely turning part, not by the part itself. Nothing in the kinetic seal rubs against anything else at any time—in fact, the clearances aren't even close. Because there is no packing there is no possibility of contaminating the product being pumped.

Visible leakage from a stuffing box can be spotted and corrected when it occurs, but in many situations the invisible leakage of air or gas *into* the liquid can be a source of great trouble and expense. The LaBour kinetic seal cannot deteriorate through wear, and cannot leak in either direction.

If you haven't considered *all* the advantages of LaBour Type G with its kinetic seal, it will pay you to write us for the complete story.

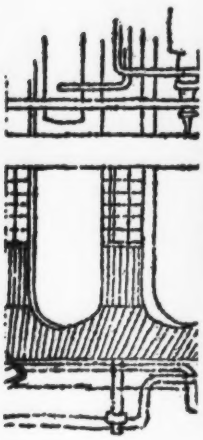
ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

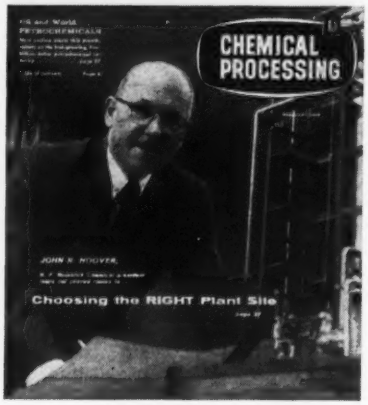
LABOUR

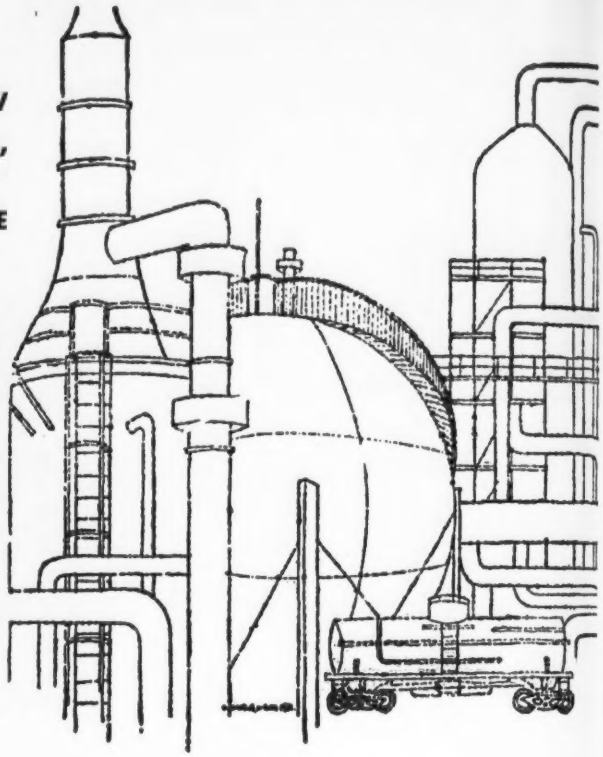
THE LaBOUR COMPANY, INC. • ELKHART, INDIANA, U. S. A.

Check 3376 opposite last page.

THE NEW "EXECUTIVE SIZE" OF CHEMICAL PROCESSING MAGAZINE







Have you noticed? . . . the last six issues of CHEMICAL PROCESSING have been *different!* Lay this copy alongside an earlier issue (before July) . . . compare them. Hold the new issue in your hands . . . slip it into your brief case. It "fits" . . . invites easy reading . . . for busy chemical executives.

IT NAMED ITSELF "THE EXECUTIVE SIZE" . . .

for the new format has been styled for today's busy executives . . . expanded main editorial sections covering subjects vital to the management team in chemical processing industries . . . prepared in the established Putman editorial style.

AN EARLIER ORIGINAL DESIGN IMPROVES . . .

Nineteen years ago Putman Publishing Company created the original design for business magazines, known as "King Size" . . . bringing heretofore unknown visibility and greater effectiveness in editorial presentation (yes, for advertising, too). Scores of other magazines adopted this format, and use it today.

Now, the "Executive Size" brings you new advantages . . . while retaining the best of the old.

Turn to pages 46 and 47. Look at the unusually effective presentation of the editorial matter . . . the easy-to-read, easy-to-follow layout.

Leaf anywhere through the magazine . . . editorial material *everywhere* . . . front and back. No solid sections of advertising pages . . . newspaper-width editorial columns invite easy reading throughout.

We think you'll find the new "Executive Size" of CHEMICAL PROCESSING easier to read, more interesting. Don't you agree? We'll welcome your comments.

All Putman magazines now appear in this new "Executive Size" . . . FOOD PROCESSING, FOOD BUSINESS, POWER INDUSTRY as well as CHEMICAL PROCESSING.

PUTMAN PUBLISHING COMPANY 111 E. DELAWARE PLACE • CHICAGO 11, ILLINOIS

"Executive Magazines for Industry"

Market Research

From page 50

ions on a subject on which they were obviously well qualified. Almost without exception every dealer volunteered information about *which* distribution system he would pick and why, giving examples of the strong and weak points of the various private distributors, including the one in whom we were interested.

Avoid the pitfall of expecting respondents to be interested in your problem! Present it to them so that it is *their* problem.

Only several weeks ago a market researcher told me this story of a recent experience. About six months before, he had been employed by a company which manufactured industrial heating units. At the request of the president — and with his daily help — he immediately started a marketing study in three broad areas:

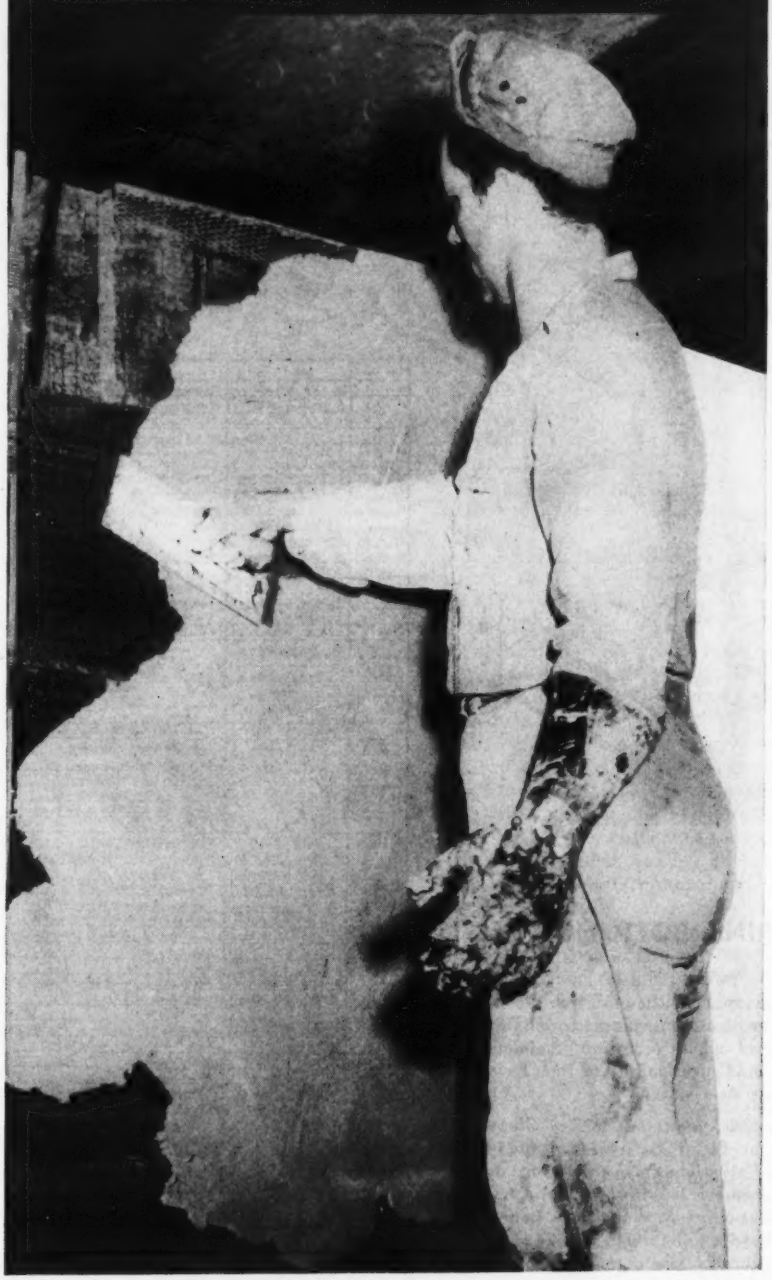
- An analysis of the company's entire line of heating units in comparison with their principal competitors' — in terms of performance characteristics reported by users.
- An analysis and evaluation of the company's advertising and public relations program.
- An appraisal of sales potentials and quotas by sales territories and by types of industries.

In his preliminary planning and definition of the problems, the market researcher sought the help of various people in the company; on the first problem, the design engineering staff; on the second problem, the advertising and public relations director; and on the third problem, the sales manager. Without realizing it, however, he listened much more to the president of the company, whose advice and ideas out-weighed those of the

Turn to page 64

For more information on product described in preceding center spread specify 3377 . . . see information request blank opposite last page.

NOW – 30% More Coverage and a finish WHITER than ever



. . . with BALDWIN-HILL IMPROVED SUPER POWERHOUSE® CEMENT

Baldwin-Hill research has developed an IMPROVED Super Powerhouse single-coat, insulating-finishing Cement which provides greatly increased dry coverage — 144 sq. ft., ¼ in. thick or 72 sq. ft., ½ in. thick, per 100 lbs. In addition to greater coverage, shrinkage on drying is negligible, insuring tight joints and freedom from cracks.

The new Improved Super Powerhouse trowels to a high glaze in a bright white finish. And rain, sleet or snow does not adversely affect the cement after setting.

See the B-H catalog in Sweet's Plant Engineering File.

BALDWIN-HILL COMPANY

Complete line of Industrial Insulations

402 Breunig Avenue · Trenton 2, N. J.

Kalamazoo, Mich. • Huntington, Ind. • Temple, Texas

Write for new 1958 brochure on B-H Improved Super Powerhouse Cement and its companion product, B-H Mono-Block.®

Check 3378 opposite last page.

JENKINS PRACTICAL PIPING LAYOUTS

81

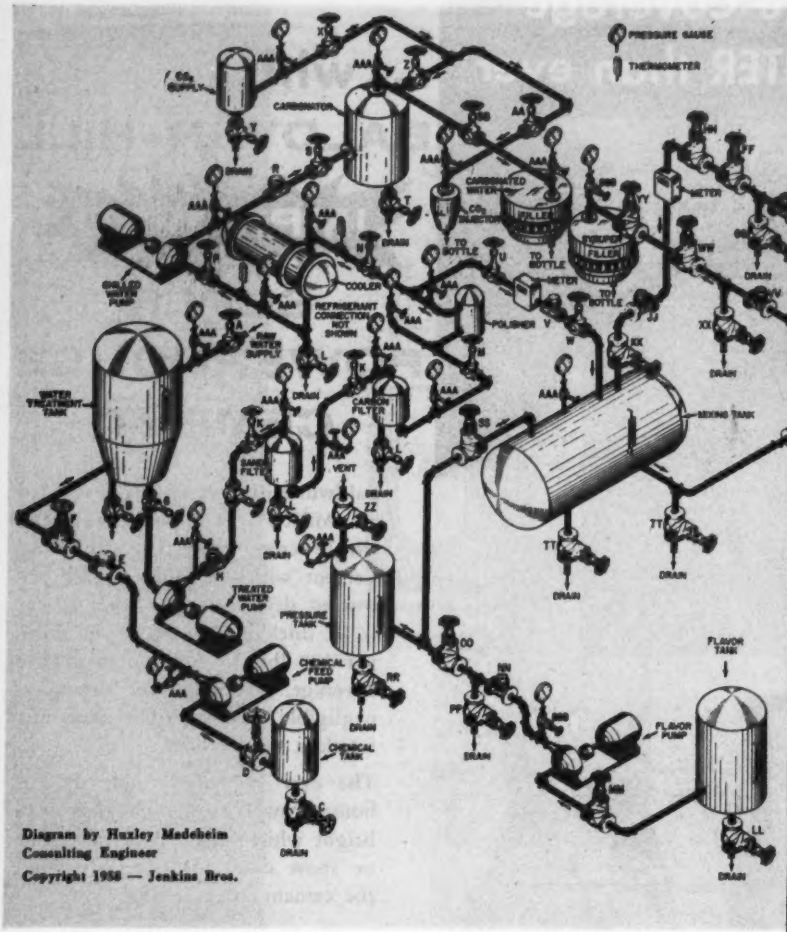


Diagram by Huxley Madeheim Consulting Engineer

Copyright 1958 — Jenkins Bros.

Code	Quan.	Jenkins Valves		Service
A	1	Fig. 106-A	Br. Globe	Control Raw Water Supply
B	1	" 106-A	Br. Globe	Drain Water Treatment Tank
C	1	" 81	All Iron Globe	Drain Chemical Tank
D	1	" 100-A	All Iron Gate	Shutoff Chemical Feed Pump
E	1	" 85	All Iron Sw. Chk.	Prevent Backflow into Chemical Feed Pump
F	1	" 81	All Iron Globe	Control Chemical Feed Pump
G	1	" 47-U	Br. Gate	Shutoff Treated Water Pump
H	1	" 92-A	Br. Sw. Chk.	Prevent Backflow Through Treated Water Pump
J	1	" 106-A	Br. Globe	Control Treated Water Pump
K	2	" 47-U	Br. Gate	Shutoff Filter Feed
L	2	" 106-A	Br. Globe	Drain Filter
M	1	" 47-U	Br. Gate	Shutoff Polisher Feed
N	1	" 47-U	" "	Shutoff Cooler Feed
O	1	" 106-A	Br. Globe	Drain Water Cooler
P	1	" 47-U	Br. Gate	Shutoff Chilled Water Pump Feed
R	1	" 92-A	Br. Sw. Chk.	Prevent Backflow Through Chilled Water Pump
S	1	" 106-A	Br. Globe	Control Chilled Water Pump Feed To Carbonator
T	1	" 106-A	Br. Globe	Drain Carbonator
U	1	" 47-U	Br. Gate	Shutoff Water To Mixing Tank Meter
V	1	" 92-A	Br. Sw. Chk.	Prevent Backflow Through Treated Water Meter
W	1	" 106-A	Br. Globe	Control Water Feed To Mixing Tank
X	1	" 106-A	Br. Globe	Control CO_2 Supply To Equipment
Y	1	" 106-A	" "	Drain CO_2 Supply
Z	1	" 106-A	" "	Control CO_2 Supply To Carbonator
AA	1	" 106-A	" "	Control CO_2 Supply To Injector
BB	1	" 106-A	" "	Control Carbonated Water Supply To Filter
CC	1	" *1313	S. S. Globe	Drain Liquid Sugar Tank
DD	1	" 1303	S. S. Gate	Shutoff Liquid Sugar Pump
EE	1	" 1329	S. S. Sw. Chk.	Prevent Backflow Through Liquid Sugar Pump
FF	1	" *1313	S. S. Globe	Control Liquid Sugar Pump
GG	1	" *1313	" "	Drain Liquid Sugar Line
HH	1	" 1303	S. S. Gate	Shutoff Liquid Sugar To Mixing Tank Meter
JJ	1	" 1329	S. S. Sw. Chk.	Prevent Backflow Through Liquid Sugar Meter
KK	1	" *1313	S. S. Globe	Control Liquid Sugar Feed To Mixing Tank
LL	1	" *1313	" "	Drain Flavor Tank
MM	1	" 1303	S. S. Gate	Shutoff Flavor Pump
NN	1	" 1329	S.S. Sw. Chk.	Prevent Backflow Through Flavor Pump
OO	1	" *1313	S. S. Globe	Control Flavor Pump
PP	1	" *1313	" "	Drain Flavor Line
RR	1	" *1313	" "	Drain Pressure Tank
SS	1	" *1313	" "	Control Flavor Feed To Mixing Tank
TT	2	" *1313	" "	Drain Mixing Tank
UU	1	" 1303	S. S. Gate	Shutoff Syrup Pump
VV	1	" 1329	S. S. Sw. Chk.	Prevent Backflow Through Syrup Pump
WW	1	" *1313	S. S. Globe	Control Syrup Pump
XX	1	" *1313	" "	Drain Syrup Line
YY	1	" *1313	" "	Control Syrup Supply To Syruper
ZZ	1	" *1313	" "	Vent From Pressure Tank
AAA	18	" 106-A	Br. Globe	Control Pressure Gage
BBB	4	" 1312	S. S. Globe	" " "

*Or Fig. 1317-A, Multiple Bolted Bonnet Globe

How to plan piping connections for

A CARBONATED SOFT DRINK BOTTLING PLANT

Preparation and bottling of soft drinks, requires a supply of treated water for diluting concentrated flavors in the mixing tank, thus making the syrup which is fed into bottles or cans by the syruper. Another operation carbonates water and feeds it into the bottles as the second ingredient. This layout also may be used for a "pop" *canning* plant, by changing the connections out of the three fillers.

The water treatment system here is typical. Bottles (or cans) are first filled with syrup from the mixing tank, then filled with carbonated water and, just before closure, injected with carbon dioxide gas to eliminate air.

Water treatment lines are red brass or copper with bronze valves and bronze-fitted pumps. The chemical line is controlled with all-iron valves to minimize effects of alkali corrosion. Stainless steel liquid sugar and flavor lines have stainless steel valves.

Either the Jenkins Fig. 1317-A Globe Valve or Fig. 1313 Twin Bolt Body Globe Valve (shown in the layout) is recommended. Jenkins Fig. 1317-A has the advantage of a multiple bolted body-bonnet joint which assures absolute tightness yet permits easy dismantling for cleaning or renewal of parts.

For details of valves to suit varying conditions see Jenkins Catalog. Consultation with accredited piping engineers and contractors is recommended when planning any piping system. Jenkins Bros., 100 Park Ave., New York 17.

JENKINS
LOOK FOR THE JENKINS DIAMOND
VALVES
JENKINS SINCE 1864 Jenkins Bros
Sold Through Leading Distributors Everywhere

Check 3379 opposite last page.

Market Research

From preceding page

others. Gradually he became aware of a distinct loss of interest on the part of almost everyone except the president.

The completed studies strongly reflected the views of the president. Results were analyzed and put together in large and complete report form, and copies sent to the appropriate company members.

Two months have passed since then and these studies have quietly been put in their final resting place — filing cabinets! The market researcher is treated politely, but like a stranger. Even the president is so busy traveling around the country selling some of the best prospects that he has forgotten all about the research that merely confirmed "what he knew all along."

From this case history a number of observations can readily be made.

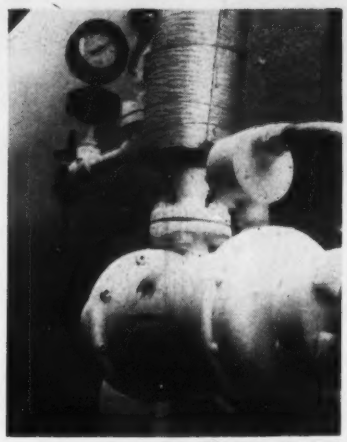
Avoid the pitfall of failing to get the full interest and cooperation of the people who will use your research. Presell your research right from the start by enlisting the efforts of the people concerned in helping to define the problem. Give them a feeling of participation in the study from beginning to end. Keep them informed as the research progresses, and lastly let them assist in the interpretation of the findings and in a recommended program of action.

Avoid the pitfall of submitting "encyclopedic" reports. Don't send a large, complete, eight-pound tome to executives and expect them to do anything with it, except to bury it in a filing cabinet. Give them one-page executive summaries!

Avoid the pitfall of relinquishing your research leadership to a non-researcher. Maintain status for yourself and your research studies by keeping control of your projects from the very start. Unless you establish and maintain your leadership and the respect of all interested parties, including the president, your effectiveness will sink to the level of your voluminous reports in the filing cabinets — quiet oblivion! ■

Every chemical engineer knows that transferring liquid chlorine is no snap. Moving it with air or inert gas works, but not always without difficulty. Diamond Alkali solved the problem by switching to a sealless pump that . . .

Speeds liquid chlorine loading 140%



Photos by CP Staff
Pump handles 10-15 gpm of −10°F liquid chlorine

TED F. MEINHOLD,
Associate Editor
with **E. FOGELMAN,**
Plant Superintendent
Diamond Alkali Company,
Edgewood, Maryland

Problem: Considerable difficulty was encountered transferring −10°F liquid chlorine, from 50-ton capacity storage tanks into cylinders and tank cars at Diamond Alkali Company, Edgewood, Maryland. Compressed air at 100-110 psi, with a dew point of about −40°F, was used to move the material.

Delays were especially encountered during hot weather. The chlorine would flash as it entered the warm containers, causing back-pressure to build up and stop the movement of material. Whenever this happened the container would have to be vented to reduce the internal pressure before loading operations could be resumed.

This "sniffing down" procedure often had to be performed as much as three or four times during the loading of a single cylinder. Not only were the delays annoying, but they resulted in a considerable loss in production.

Tank cars had to be vented constantly to prevent this problem. The large volume of air required sorely overtaxed the compressed air supply system.

The vented "snift gas," a mixture of chlorine gas with air and other inert non-condensables, is sent to a Diamond Alkali-developed chlorine recovery system (see flowsheet) where over 99.9% of the chlorine is recovered. System uses carbon tetrachloride to absorb the chlorine from the snift gas. The chlorine-rich solution is then fed to a still which strips off the chlorine.

Solution: Engineers installed a Model DE Chempump for the loading operation. Unit is a double-end, two-stage, 3450-r p m centrifugal pump, having no stuffing box or seals. No lubrication or special foundation is required.

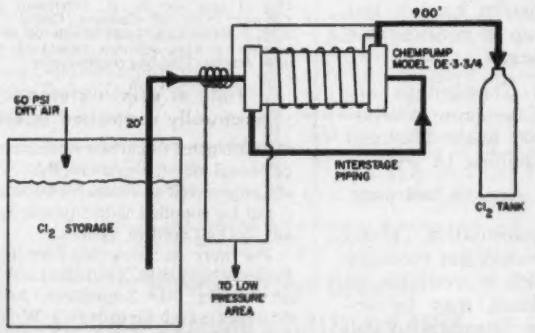
The pump has a flow rate between 10-15 gpm. Suction pressure is 60 psi; discharge varies from 150-300 psi. Suction line consists of 20′ of 2″ pipe reduced down to 1″ on the pump. Discharge is 900′ of 2″ pipe reduced to ¾″ on pump.

The pump chamber and impeller are made of cast steel, while all other wetted parts are 316 stainless. Shaft journals and impeller are chrome plated. Thrust washers a r e carbon faced. Standard Graphitar bearings are used.

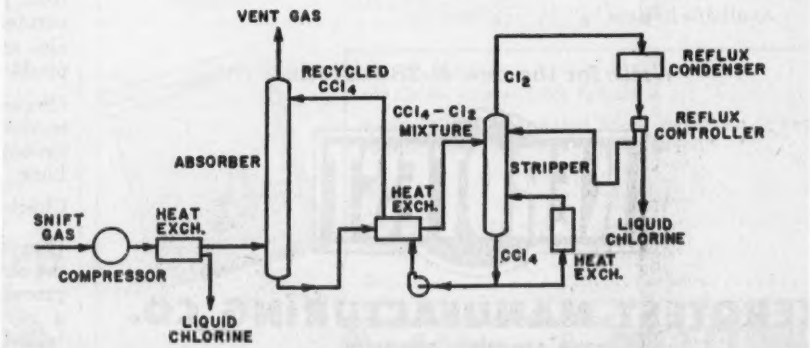
Priming is done by means of a 60 psi blanket of dry air maintained in the chlorine storage tanks. To prevent any flashing of chlorine inside pump, special cooling provisions were provided. A length of ⅜″ diam copper tube was tapped into the discharge line just after the discharge flange (see drawing), wrapped around the motor section for several turns, and then led to the plant's low pressure chlorine area. A second length of tube was also tapped in at same point and given several turns around the suction line.

Spaces between cooling coils, motor section, and suction line were filled with a plastic heat transfer compound and then insulated. Heat of vaporization, as the liquid chlorine turns to gas when expanding in going from the high to low pressure area, is supplied by the motor and suction line. In other words, the motor section and suction line are subcooled and flashing is prevented.

Results: Loading delays due to back-pressure b u i l d u p s have been eliminated. During the hot



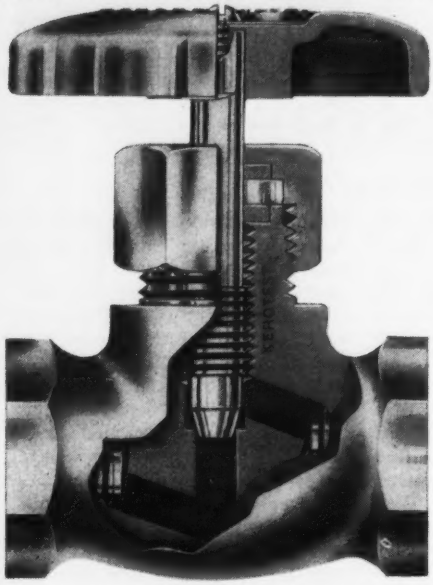
Motor section and suction line of sealless pump are subcooled to prevent flashing of chlorine in the pump



Snift gas recovery system, developed by Diamond Alkali, recovers over 99.9% of vented chlorine

NEW

for applications where space is limited and operating areas are close



- accurately controlled
- perfect shut-off
- high pressure

KEROTEST N·28

GLOBE TYPE NEEDLE VALVE

Short, compact, precision-machined, this new Type N-28 Valve is designed for services which demand accurate control.

One-piece forged carbon steel body—12/14 chromium heat treated stainless steel stem, Teflon packing—maximum working pressure 10,000 p.s.i. at 70° F.

Available in sizes ⅛", ¼", ⅜" and ½".

Write for the new N-28 Bulletin

KEROTEST

KEROTEST MANUFACTURING CO.

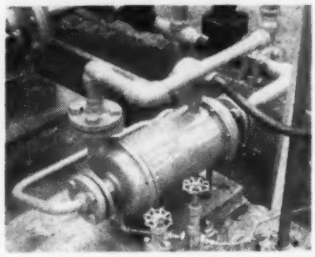
2518 LIBERTY AVENUE

PITTSBURGH 22, PA.

Check 3380 opposite last page.

weather, a single shift now loads almost 2½ times as much chlorine formerly done by two shifts — or 48 tons instead of 20. Installed in 1956, the pump has operated satisfactorily without any major maintenance.

Careful purging with air takes place before routine shutdowns. This eliminates any possibility of residual chlorine forming corrosion products by hydrolysis with moisture in air.



The results obtained with the chlorine pump were so encouraging, that a similar unit was installed in the chlorine recovery system. This pump handles a mixture of 99% carbon tetrachloride and 1% chlorine

The sealless pump worked out so well that a similar unit was installed about six months later to solve a pumping problem in the snift gas recovery system. Operating 24 hours per day, the unit handles 10 gpm of a mixture of 99% carbon tetrachloride and 1% chlorine. Pump has been running for over 1½ years without trouble. Previous pump had to have packing replaced every two months. Because of the toxicity of the material, the almost constant leakage from the pump not only constituted a health hazard, but also added up to considerable production losses.

(Series DE Chempumps are product of Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa.)

Check 3381 opposite last page.

(Further information about the chlorine snift gas recovery process, which is available on a royalty basis, may be obtained from Diamond Alkali Company, Union Commerce Building, Cleveland 14, Ohio.)

Check 3382 opposite last page.

Highly Intimate Blends in 1 to 2 Minutes

Blends while discharging; No segregation or flotation

Sturtevant Rotary Blenders start 4-way blending while charging, continue it during discharge, thus producing highly intimate, even blends of dry and semi-dry materials – within 3 to 5 minutes of start of charging.

Six *complete* blending cycles per hour are common. And Sturtevant's special action produces no particle reduction, cleavage or attritional heat – is highly effective yet gentle and safe even with explosives.

Receiving

Scoops cascade material as drum rotates. Movement forces material from both ends to middle. Thus blending is 4-way right from start of charging.

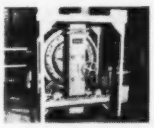
Discharging

Single gate controls charge, discharge. Blending continues throughout discharge phase. Result is no segregation or flotation — highly intimate, even blends.

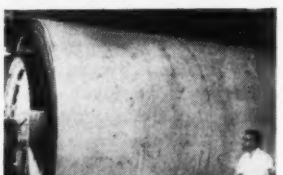
Self-cleaning, dust-sealed drum; one-man accessibility

Operation of Sturtevant Blenders is self-cleaning – drum interiors are completely dust-sealed. For inspection of all models, one man simply loosens a few lugs to remove manhole cover – quickly and easily.

Nine standard models with capacities to 900 cu. ft.



10 cu. ft. Sturtevant Blender at U.S. Steel Corp.'s new Applied Research Laboratory (Raw Materials Division) in Monroeville, Pa. This unit handles batches up to 500 lbs. — is ideal for pilot work and small runs.



One of four 450 cu. ft. Sturtevant Blenders at Celriver Plant of Celanese Corp. (Rock Hill, N. C.). These large units handle up to 20,000 lbs. batches — have a 9-year record of meeting the most exacting blending requirements.

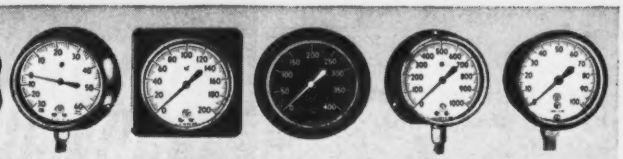
Fully or semi-automatic, or manually controlled operation

Constructed of carbon steel, stainless steel or Monel metal, Sturtevant Rotary Blenders are engineered to fit each customer's needs – can be supplied with injector sprays and any desired control system.

For more on Sturtevant Blenders, request Bulletin No. 080B. (Bulletins also available on Mixers, Air Separators, Micronizers, Crushers and Grinders.) Write today. STURTEVANT MILL CO., 119 Clayton St., Boston, Mass.

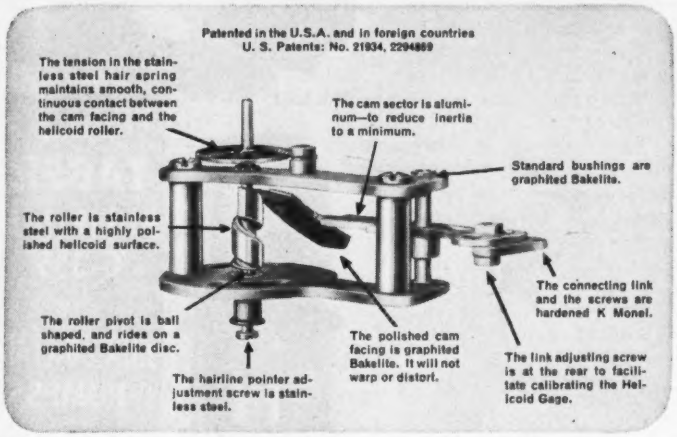
Check 3383 opposite last page.

ACCO
Helicoid Gage
U.S.A.



Nothing but the best in gages for working pressures from 30" vacuum to 10,000 p.s.i.

These details of Helicoid gage design assure longer life and enduring accuracy


Patented in the U.S.A. and in foreign countries
U. S. Patents: No. 21934, 2294889
The tension in the stainless steel hair spring maintains smooth, continuous contact between the cam facing and the helicoid roller.
The cam sector is aluminum—to reduce inertia to a minimum.
Standard bushings are graphited Bakelite.
The roller is stainless steel with a highly polished helicoid surface.
The connecting link and the screws are hardened K Monel.
The roller pivot is ball shaped, and rides on a graphited Bakelite disc.
The polished cam facing is graphited Bakelite. It will not warp or distort.
The link adjusting screw is at the rear to facilitate calibrating the Helicoid Gage.
The hairline pointer adjustment screw is stainless steel.

The superiority of Helicoid Gages is most evident in severe service—wherever a gage is subjected to violent pressure pulsations or severe mechanical vibrations.

The *sustained accuracy* of Helicoid Gages over *millions of cycles* is explained by the details of design and construction of the Helicoid movement shown above. Such Helicoid features—protect against wear and corrosion and assure sensitivity, sustained accuracy and trouble-free operation.

The Chemical Gage

The Helicoid Chemical Gage has a guaranteed accuracy of plus or minus 1%. It is applicable for working pressures from 30" vacuum to 5000 p.s.i. and temperatures to 400° F. It is particularly suitable for chemicals and other viscous fluids which might clog or corrode a Bourdon tube. Pressure and/or vacuum is transmitted directly to the indicating gage element through deflection of a Teflon or Kel F sealing diaphragm.

Tubes built for millions of pressure pulsations

To fit the wide range of applications, Helicoid Bourdon tubes are available in four materials —alloy steel, K Monel, stainless steel and phosphor bronze.

All Helicoid tubes are made from seamless tubing and are carefully designed to give maximum torque and minimum stress. When used within the dial range, they will withstand many millions of pressure pulsations and will not stretch, leak or crack.

For complete information on the Helicoid line of gages write for Catalog G-52

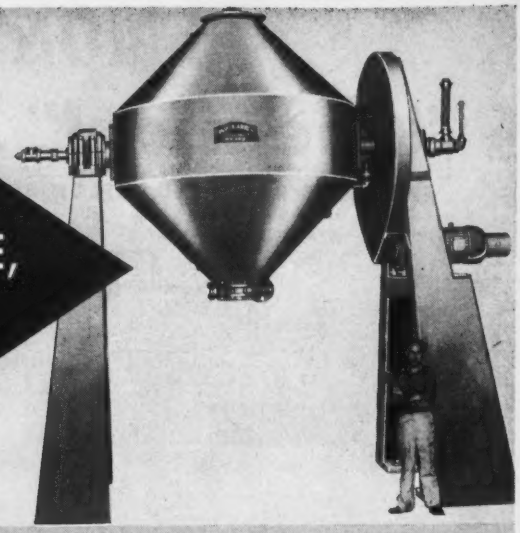
Helicoid gives you all these features at prices that are competitive in the quality gage field.

Helicoid Gage Division
AMERICAN CHAIN & CABLE
929-P Connecticut Avenue • Bridgeport 2, Connecticut

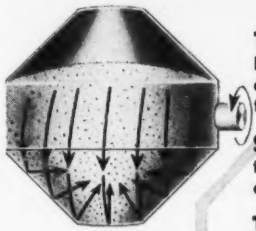
ACCO TRADE MARK

Check 3384 opposite last page.

For QUICK, COMPLETE, EVEN DRYING



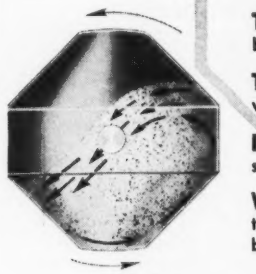
use the Paul O. Abbé ROTA-CONE VACUUM DRYER



The gentle agitation of the Paul O. Abbé Rota-Cone Vacuum Dryer gives the material quick, even, complete drying of the entire batch. No wet and dry spots can occur as with some other types of dryers.

So gently is the material agitated, that there is no contamination or degradation of even the most delicate materials. Yet the entire load is kept constantly in motion so it dries uniformly.

The Paul O. Abbé Rota-Cone Vacuum Dryer can also be used as a Cone Blender. You get the use of two machines for the price of one! The Paul O. Abbé Rota-Cone action produces a perfect blend.



The machine is easy to clean, since there are no agitators or baffles. There is no dust, since an internal filter is used.

The Paul O. Abbé Rota-Cone is safe. No poisonous or otherwise hazardous fumes can escape.

If you are not now using this Rota-Cone, your drying operations suffer.

Write us now for folder illustrating and describing in detail, the Paul O. Abbé Rota-Cone Vacuum Dryer. Just use the coupon below. No obligation.

Paul O. Abbé Inc.
402 Center Avenue, Little Falls, N. J.

Please send me illustrated folder describing in detail the Paul O. Abbé Rota-Cone Vacuum Dryer.

Name.....
Company.....
Street.....
City.....State.....

PAUL O. ABBE INC.

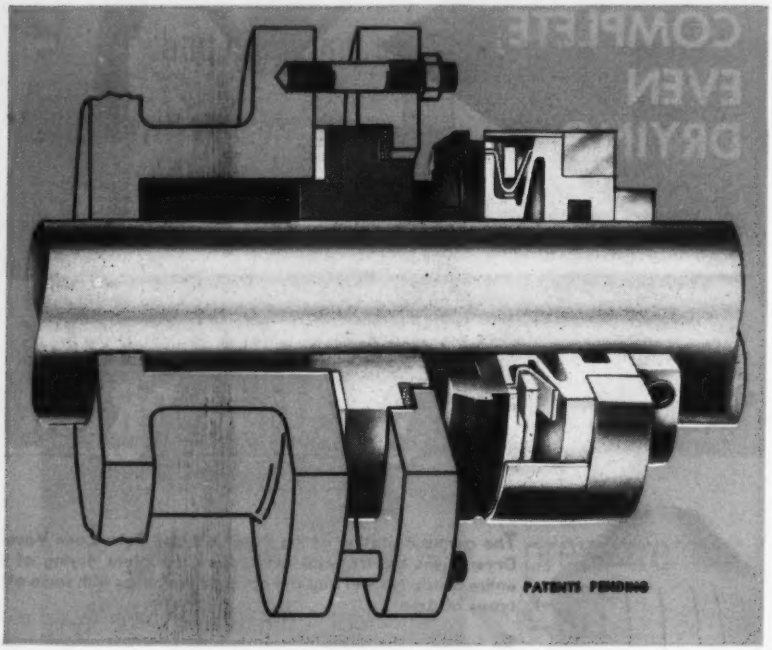
402 CENTER AVENUE LITTLE FALLS, NEW JERSEY

Check 3385 opposite last page.

BELMONT

"Chemical" SEAL

(PRESSURE BALANCED TEFLON BELLOWS DESIGN)



- **Greatest immunity to corrosion**
- **Longest useful life**
- **More economical than any other design or materials combination**

Customers report unsurpassed performance in difficult corrosive service with the BELMONT Chemical SEAL. A rotating mechanical seal, it employs a pressure balanced TEFLON* bellows design, free from the weaknesses (corrosion and flexural fatigue) of conventional metallic bellows.

Rotating with the shaft, only bearing surface is between rotating and stationary seal faces. No scoring of shafts. Will work satisfactorily on shafts previously scored by other seals or conventional packing.

Provides a perfect fluid seal without high friction load on the shaft and attendant high power costs. Greatly reduces hazards of handling flammable, explosive, corrosive and toxic liquids, and will handle abrasive slurries (when proper flushing means are provided). For pressures at the seal up to 100 psi at 75° C. Temperatures to 100° C at 75 psi. Standard sizes to fit shafts from ⅛" to 2¼".

Ask Your Belmont Distributor or write for Catalog T-57.

The Belmont Packing and Rubber Company
Butler & Sepviva Streets, Phila. 37, Pa.

* du Pont Trademark

BELMONT

Check 3386 opposite last page.

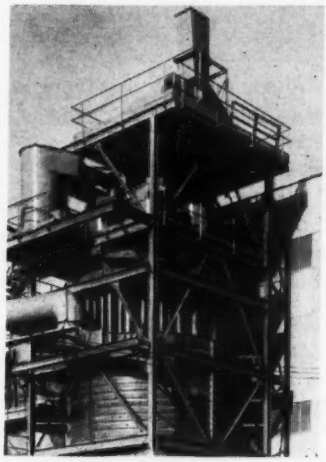
NEW SOLUTIONS

Sulfuric acid mist tamed by lead precipitator at Glidden

Unit handles calciner gases with 95% efficiency

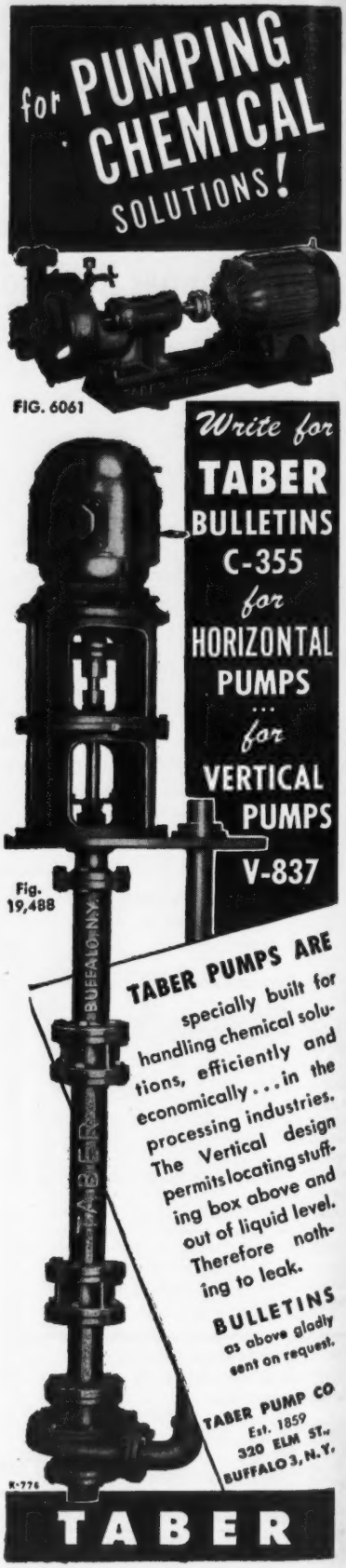
Problem: Production of titanium dioxide at the Glidden Co., Baltimore, Maryland, generated large quantities of sulfuric acid mist. Since Glidden's management was acutely aware of the serious damage which could be caused by this mist, control was imperative. Selection of proper mist eliminating equipment was critical since corrosive characteristics of exhaust gases were severe.

In producing titanium dioxide, ilmenite ore is digested with 66% Bé sulfuric acid. The titanium is converted to a soluble sulfate which is separated from other reaction components, hydrolized, and calcined to give the desired titanium dioxide.



Electrostatic precipitator handles sulfuric-acid-containing calciner gases at a rate of 29,000 cubic feet per minute

Solution: In January 1956, on basis of a previously successful installation of an electrostatic precipitator in another Glidden plant on a similar service, Glidden installed an electrostatic precipitator to handle calciner gases. Precipitator is of lead-type design. More than 50 tons of 10-lb chemical-sheet lead were used in construction of the unit which weighs approxi-



Check 3387 opposite last page.

mately 120 tons. It's 70′ high, and 20′ in diameter. "Cage" or "basket" design was used, in which a steel framework supports the lead shell and tubes.

Results: The precipitator removes sulfuric acid mists and dusts from calciner gases with an efficiency of 95%. Gases are handled at a gas rate of 29,000-cu-ft per minute. Maintenance is a minimum, requiring only occasional replacement of electrodes and cleaning of insulators. Design permits easy accessibility for inspection and servicing.

Recovered acid can be used in certain parts of the operation in lieu of virgin acid.

(Precipitator and all accessory equipment were supplied by Research-Cottrell, Inc., Bound Brook, N. J.)

Check 3388 opposite last page.

Cast iron, steel surfaces efficiently cleaned with blast grit

Prepares surfaces for corrosion-protective coating

Problem: A chemical manufacturer in New Jersey found that cast iron and steel surfaces could not be properly protected from corrosion by painting over superficially cleaned surfaces.

Solution: Surfaces were cleaned by sandblasting with a grit that does not contain any free silica. Chemical analysis shows 23% FeO, 21% Al_2O_3, and 43% non-free silica.

Sharp grain structure gives fast cutting action, leaving surfaces completely free of corrosive deposits.

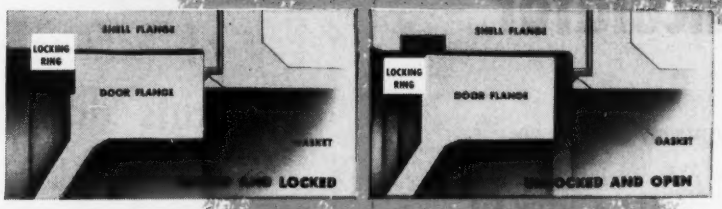
Results: Company has found blast grit to be an efficient method of preparing surfaces for painting.

Because grit is free of silica and practically dustless, dangerous health hazard is not present.

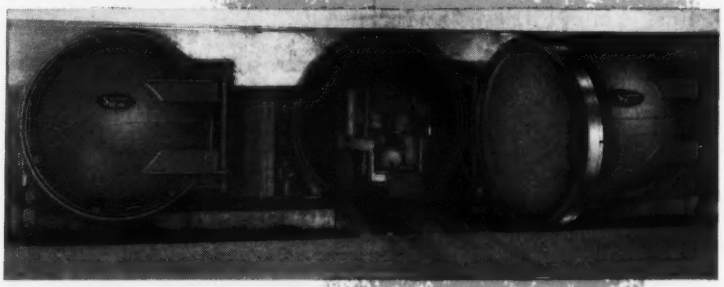
(Black Beauty Blast Grit is product of H. B. Reed Corp., 91 Passaic St., Passaic, N.J.)

Check 3389 opposite last page.

Looking for Positive
QUICK OPENING DOORS?



Locking ring expands into shell flange forcing door flange into compression with resilient lip gasket for pressure or vacuum seal.



ONE FAST, AUTOMATIC ACTION CLOSES AND LOCKS

Simplicity of operation is one of the outstanding features of Ring-Lok Doors. 45 seconds is all it takes to hydraulically open and close a Ring-Lok up to 12′ in diameter. Resilient lip-type gasket is used for positive sealing against pressure or vacuum. Applicable to either vertical or horizontal vessels, they can be used with working temperatures up to 400°F and pressures to 350 psi.

Look no further for closures that are low in initial cost, low in maintenance costs and high on performance. You'll find them every time in Struthers Wells Ring-Lok Doors.

STRUTHERS WELLS PRODUCTS

PROCESSING EQUIPMENT DIVISION
Crystallizers . . . Direct Fired Heaters . . . Evaporators . . . Heat Exchangers . . . Mixing and Blending Units . . . Quick Opening Doors . . . Special Carbon and Alloy Processing Vessels . . . Synthesis Converters

BOILER DIVISION
BOILERS for Power and Heat . . . High and Low Pressure . . . Water Tube . . . Fire Tube . . . Package Units

FORGE DIVISION
Crankshafts . . . Pressure Vessels . . . Hydraulic Cylinders . . . Shafting . . . Straightening and Back-up Rolls

STRUTHERS WELLS *Corporation*

TITUSVILLE, PA. Struthers Wells Plants at Titusville and Warren, Pa.

Offices in Principal Cities

Check 3390 opposite last page.

NEW Filter Area Calculator

Quickly tells you the required area on basis of BOTH the *filtration rate* and the *cake capacity*. The calculation indicating the greater area is your safe guide. Yours FREE with the compliments of Niagara.

SEE CHEMICAL ENGINEERING CATALOG *for facts on Niagara's vertical and horizontal pressure-leaf filters and horizontal plate filter.*

Niagara FILTERS

A DIVISION OF

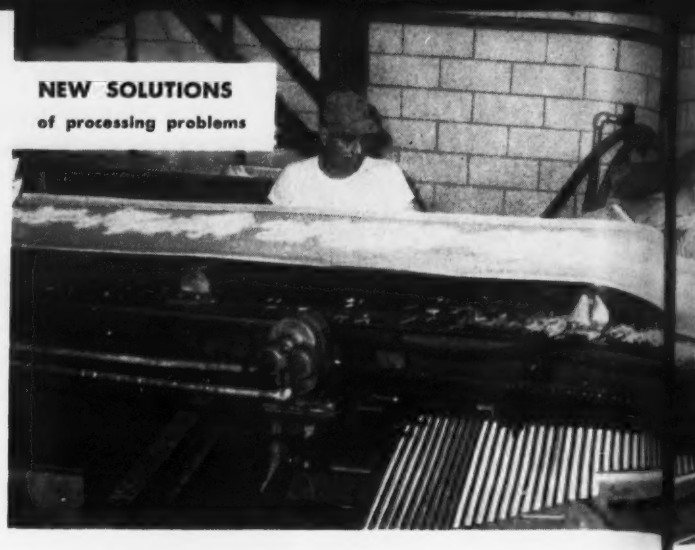
American Machine and Metals, Inc.

Dept. CPN-258, EAST MOLINE, ILLINOIS

(Niagara Filters Europe: Kwakelpad 28, Alkmaar, Holland)

SPECIALISTS IN LIQUID-SOLIDS SEPARATION

Check 3391 opposite last page.



At American Agricultural Chemical Co., gelatin processing required considerable manual labor. Production rate was seriously affected by changes in weather. By modernizing its processing operations, company . . .

improves uniformity of heat-sensitive product and cuts drying time over 90%

- **Costly manual labor is eliminated**
- **Summer shutdowns ended**

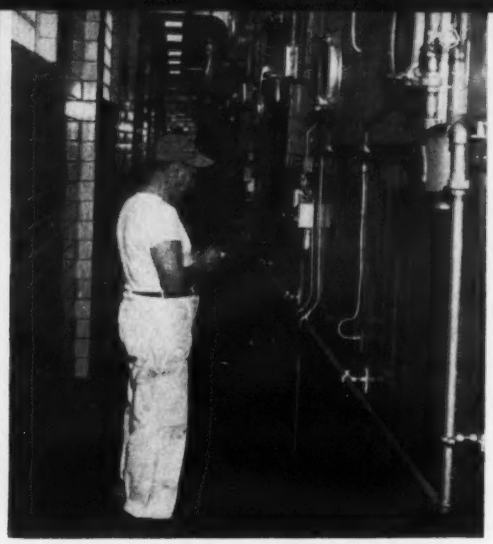
THEODORE W. WETT
Assistant Editor
E. W. SALE
Plant Superintendent
American Agricultural
Chemical Co., Detroit, Mich.

Problem: Summer humidity dropped dryer capacity to almost zero at American Agricultural Chemical Co. Entire gelatin process had to be shut down for two and sometimes three months during mid-summer because heat-sensitive material could not be dried in existing equipment. Since gelatin is sold on basis of bloom and viscosity, and both are seriously affected by deterioration, temperature must be kept as low as possible.

Gelatin is water extracted from pigskin after treating it with dilute HCl. Previously, solution was concentrated to 12-14% gelatin in a single-effect evaporator, passed through a pasteurizer to a belt spreader, and then through refrigerated tunnels to set-up gelatin. Material was spread on drying frames (wood with stainless steel wire), stacked on racks, and placed in drying tunnels fed by 30,000 cfm of atmospheric air. Air could be warmed slightly in winter, when humidities were low, but proper summer operation would require complete air conditioning.

Labor costs were high. Four men were needed to operate extraction, evaporation, and chilling equipment plus one for drying tunnel. A crew of 10 to 12 were used to dump

▲ Oscillating belt distributes gelatin in three to four inch bed on moving stainless steel belt. Product is dried in 1/12 time formerly required



▲ Operator checks dryer temperature on 80-ft unit that has eliminated summer shutdown at American Agricultural Chemical Co.

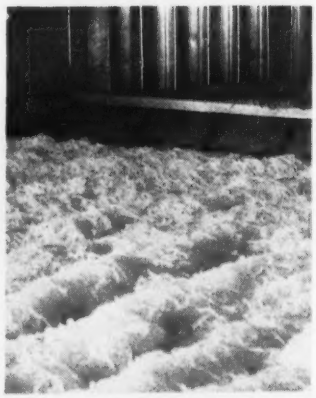
dried product. Total retention time was 24 to 36 hr.

Solution: In conjunction with a plant modernization program and a desire to provide customers with highest quality uniform gelatin, American Agricultural Chemical Co., installed a continuous low-temperature dryer and gelatin preparation line. New process line went on stream in June of 1956.

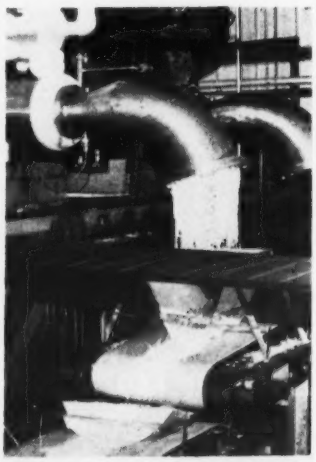
To increase obtainable concentration of gelatin (prior to drying) a turbulent, falling film evaporator was added after single-effect evaporator. Unit utilizes a controlled-speed agitator rotor to distribute viscous solution in a thin film on evaporator wall. Rotor blades keep film circulating evenly with a turbulent action and permit evaporation at low temperatures.

Dryer is 80 ft long and has a seven ft wide stainless steel moving belt. Unit is divided into eight sections by baffles which alternately pass filtered, conditioned, drying air up and down through moving bed. Provision is made for heating and partial exhaustion of air at various points and in last section, for cooling. Air is supplied at 25,000 cfm, at a controlled temperature and low dew point. Five 25-hp, and two 15-hp fans are used for circulation in the dryer.

Gelatin is fed to the dryer in a bed three to four inches

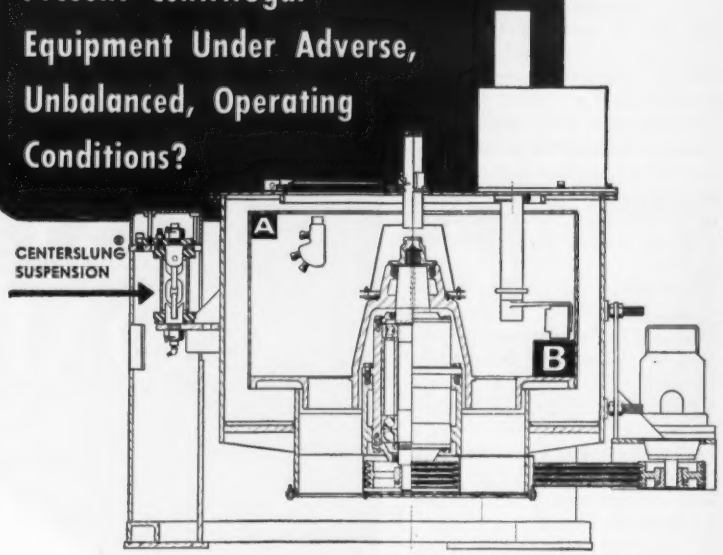


Bed of gelatin as it moves through dryer. Low drying temperature possible with system maintains product quality



Lacerated "noodles" create greatest surface exposure during drying

How Stable Is Your Present Centrifugal Equipment Under Adverse, Unbalanced, Operating Conditions?



Section of new Tolhurst Batch-O-Matic® combining for the *first time* Centerslung® suspension with bottom discharge, PLUS fully timer-controlled automatic batch programming.

Will your centrifugal equipment operate safely —

A WITH A DYNAMIC OUT-OF-BALANCE LOAD?
(Up to 5 lbs. out of balance at "A")

B WITH A STATIC OUT-OF-BALANCE LOAD?
(Up to 20 lbs. out of balance at "B")

The new Tolhurst Batch-O-Matic Centrifugal passed these tests with no appreciable vibration being transmitted to the foundation — only a smooth oscillation on a horizontal plane and no vertical jumping. That's real assurance of Tolhurst's stability in handling all materials, free or slow-draining, even the toughest jobs. This big operating advantage is provided by exclusive Centerslung mounting — the highly stable suspension that minimizes bearing wear, downtime and other maintenance problems resulting from excessive vibration.

For help in connection with your centrifuging problems, call in your nearest Tolhurst representative. (He is listed in Chemical Engineering Catalog.) Or, write us direct.

Tolhurst CENTRIFUGALS
A DIVISION OF
American Machine and Metals, Inc.
Specialists in liquid-solids separation
Dept. CPT-258, EAST MOLINE, ILLINOIS

Check 3392 opposite last page.

deep by an oscillating belt at 400 lb/hr, 20 to 25 % concentration.

It is extruded to this feeding belt in form of lacerated "noodles" to create greatest possible surface exposure during drying.

Between 1200 to 1600 lb of water are removed from moving bed of product per hour to reduce moisture content of gelatin to approximately 10%. Product moves through dryer in 2½ hr.

Results: Continuous, year-round operation of gelatin process is now possible at greatly increased efficiency. Product quality can be maintained at highest level because drying temperatures are low and conditions accurately controlled. Entire drying portion of process is controlled by a single operator and costly manual labor has been eliminated. Retention time of product in drying stage has been cut over 90% of former value.

While dollar saving per pound of products is difficult to calculate, management at AAC feels that dryer will return its purchase price in three to four years. Equally important, uniform high quality can be maintained so that product commands top price in a competitive market.

(Drying cycle dryer and air conditioning equipment were designed and supplied by Kathabar Div., Surface Combustion Corp., Toledo 1, Ohio.)

Check 3393 opposite last page.

(Turba-Film evaporator is a product of Rodney Hunt Machine Co., Orange, Mass.)

Check 3394 opposite last page.

More efficient filtration obtained through use of non-woven felts

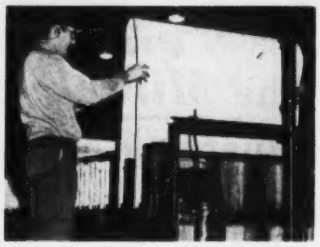
Acts as gasket for filter cloth, cuts plate leakage

Producer of dyestuffs, solvents, gelatin, and granular residues, Wilson Organic Chemicals, Inc., Sayreville, N. J., reports more efficient chemical filtration and econ-

TYPE "Y"
PACKAGE TYPE
STATIONARY
COMPRESSORS

omies through use of non-woven felt as covering for woven filter cloth on plate-and-frame filter presses. The felt, a high-density matting made of Union Carbide's Dynel acrylic fiber, acts as an efficient gasket to reduce plate leakage and stop rim cutting.

Wilson reports that use of



Non-woven felt covering for filter cloth on 42" press reduces plate leakage and stops rim cutting

one cloth and one mat costs less than two cloths, and time to get press back into operation after cleaning is cut to minimum. Chief cost advantage is the material's long life.

Full operating pressure is built up quickly with rapid wettability and cake formation. Dynel felts and fabrics are highly resistant to most chemicals, including acids, bases, oxidizing agents and solvents, as well as being mold- and mildew-proof.

(Dynel felts are made by American Felt Company, Glenville, Conn.)

Check 3396 opposite last page.

Latest trends and developments

. . . in material handling equipment and procedures will be highlighted in next month's CHEMICAL PROCESSING. These discussions will make up a major part of a feature devoted to material handling and its role in the chemical processing industries. Several case history stories will point out how chemical processing companies have been able to realize savings with improved material handling methods.

- 75 to 250 horsepower
- for vacuum service and pressures to 5,000 pounds
- one to four stages of compression
- built-in motor, coupled or belt drive

economical

simple · compact

long life · low upkeep

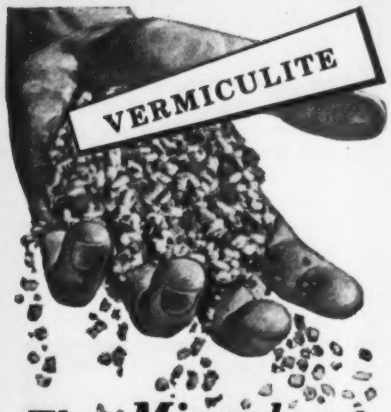
adaptable · smooth

easy to install

Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS

Check 3395 opposite last page.



The *Miracle* of Industry's Newest $ Saver!

A man can walk safely over a 2000° F. red-hot ingot covered by only a 2" blanket of vermiculite! Yet, at minus 300° F., vermiculite performs hard-to-do insulating jobs in liquid oxygen plants!

This spectacular insulating quality, long known in the construction field, is just one of vermiculite's amazing characteristics. For instance:

Fireproof, it snuffs out flame...is being used as a safety factor in explosives; was packaged as a "bomb-snuffer" in World War II.

Absorbent, it is being used as a carrier to turn liquid chemicals into *free-flowing* solids; as a water-holding soil conditioner for farm crops, plant growth.

Lightweight, it has cut thousands of tons of dead-weight in a single building, slashing costs.

Resilient An extraordinary cushioning material for fragile glassware, delicate instruments, bottled chemicals.

Can Be Processed to almost any granular need...as fine as 27,000,000 particles per pound for effective use as chemical carrier, additive, pigment for paint.

These are just a fraction of the examples showing how ZONOLITE brand vermiculite serves industry. Regardless of your problem, vermiculite may offer some profitable, practical application in terms of its absorptive, catalytic, dielectric, filler, insulating, lubricating and resilient characteristics.

Let us show you how vermiculite may improve your product, cut costs, speed production and distribution.

ZONOLITE®
Vermiculite

MAIL COUPON TODAY...

Zonolite Company, Dept. CP-28
135 South LaSalle St., Chicago 3, Ill.
Please send me valuable free booklets illustrating over 30 Industrial Applications of Vermiculite.

NAME .....
FIRM NAME .....
ADDRESS .....
CITY .....ZONE....STATE.....

Check 3397 opposite last page.

NEW SOLUTIONS

Container cuts cost — uses less space, keeps shape

Results in considerable savings to Tennessee Eastman

Packaging system originally developed for the flour milling industry has been successfully adapted by Tennessee Eastman Company for packaging cellulose acetate. Key factor in the system is a semi-rigid container made of a single ply of resilient, heavy-duty kraft paper.

In its original application, the principle of the semi-rigid container was that when 2-, 5-, 10-, and 25-lb packages of flour were tightly compressed into the container with automatic equipment, the whole unit made a rigid package. Package will not lose its shape when highly stacked, and won't crumple when exposed to high humidity.

In packaging cellulose acetate, however, the multiple loading principle is not a factor. Cellulose acetate is a flaky product which is put in a press and formed into a rectangular block sufficiently hard to permit baling.

Previously, these blocks were placed into expensive, heavy baler bags. By using the semi-rigid container, not only is excellent packaging performance achieved, but a considerable saving also results.

The cakes of cellulose acetate are pushed into the container by the plunger of the baling machine. End flaps of the container are then folded by hand, and sealed with tape.

As a result of using the semi-rigid container instead of a baler bag, Tennessee Eastman now has lower packaging costs. Since the containers require less space than conventional containers, and can be stacked efficiently, overall warehouse storage space and costs have been reduced considerably.

(Semi-rigid container packaging system is a development of St. Regis Paper Company, 150 East 42nd St., New York 17, New York.)

Check 3398 opposite last page.

BISONITE'S #957 COATING SYSTEM

for Superior Corrosion Control

COATINGS

CORROSION REPORT Material	BISONITE "957" Resistance Excellent	Good	Poor
Acid			
Alkali			
Solvent			

To prevent Corrosion by and Contamination of
Food Products Heavy Chemicals Beverages
Oils and Greases Hot Water
Salts Solvents

A thermally cured coating that resists acids, solvents and alkalis

- Permanent adhesion.
- Withstands 72% caustic at 130°C. for prolonged periods.
- Strong • Tough • Flexible.
- Glazed glasslike surface.
- Greater thickness in fewer coats. Reduces cost.
- A NEW Advance in the field of applied coatings.
- Applied by qualified applicators across the nation.

Solves many problems of chemical corrosion. For lining tanks, tank cars, pipes, food containers, storage bins, fans, ducts, hoods, etc. at moderate cost. Made by a company specializing in corrosion resistant coatings. Not a side line. BISONITE products in many cases have corrected conditions when other coatings have failed. Write for descriptive literature. Our nearest approved applicator will be glad to give your coating problems immediate attention.

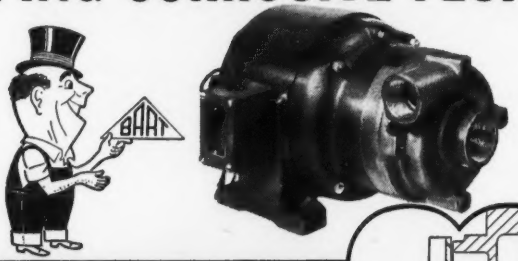
TOUGH AS BUFFALO HIDE

BISONITE COMPANY, Inc.
2246 Military Road
Buffalo 17, N.Y.

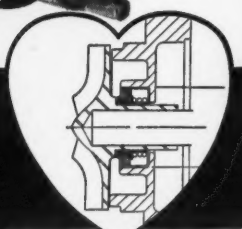
Check 3399 opposite last page.

now! greater ***safety*** *and* ***efficiency*** *in*

PUMPING CORROSIVE FLUIDS



BART
FLEX-SEAL
CENTRIFUGAL PUMPS



At last—a full line of pumps *specifically designed* to handle corrosive and abrasive fluids in the 1 to 80 GPM range, at heads to 75 feet.

No longer need you cut down bigger pumps in range and lose efficiency—or put up with undependable smaller pumps.

Bart pumps have fewer parts to wear or get out of order. Six models, each in corrosion resistant Type 20 Stainless Steel. Or other alloys on special order.

Write for catalog and performance curves.

Heart of the BART . . . the exclusive Flex-Seal!
Effectively minimizes a long-prevalent basic weakness of centrifugal pump design. Self-adjusting to wear. Needs no external lubrication. Carbon stator/ceramic seat, unexcelled for long wear—or zircon filled Teflon/work-hardened Type 20 Stainless Steel, for severest corrosive service.

BART MANUFACTURING CORP.
ELECTROFORMING • PIPE LINING & COATING • PLATERS • PUMPS • ENGINEERING DESIGN SERVICES
229 Main St., Belleville 9, New Jersey

Check 3400 opposite last page.

PROCESS PIPING POINTERS

"Combating Corrosion in Industrial Process Piping"

This authoritative technical paper No. 408 treats on corrosion far beyond the simple relation of piping metals and process fluids. It covers the basic problems and makes recommendations in more than 100 illustrated pages. Supplied free—see below.

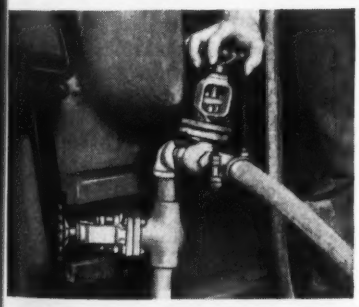
New higher nickel content in cast iron valves

8% nickel alloy iron wedge gates and companion line of swing checks are now regularly available. Corrosion resistance is substantially improved by increase in nickel content. Priced slightly above ordinary iron, these valves in 2- to 18-inch sizes are attractive values for many corrosive services. See below for literature.

Shearing action stainless valves for pulp stock handling

Two problems of pulp and paper mills —corrosion and clogging of lines—are eliminated with these high alloy steel valves. Knife-edge disc, combined with notched body outlet, shears fibers to make tight closure. New weight-saving, short face-to-face design is ideal for use with light wall pipe. Cast Type 316 bodies are rigid, and dimensionally accurate. Sizes to 16 inches. Ask for Circular AD-2156—see below.

Alloy valve stretches service life on corrosive steam



Read how a paperboard maker was replacing valves on corrosive steam every week . . . then after 12 weeks . . . stopped the trouble with Crane valves, still tight after more than a year. See next page.

Address J. E. Bradbury, Mgr., Chemical Sales Dept., for information on above products.

CRANE CO.

Gen'l Offices: 836 S. Michigan Ave., Chicago 5

VALVES • FITTINGS • PIPE

PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

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Check 3401 opposite last page.

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processing and engineering data

How to Make Nomographs – VI

Line Coordinate Charts

D. S. DAVIS
Head, Pulp and Paper Technology
University of Alabama

Frequently, for three-variable data, no equation relating the variables is available. In such instances, when one does know that a function of one variable is linear with respect to a function of a second for all values of a third, he can construct a special kind of nomograph known as a line coordinate chart.

Consider viscosity-temperature data for solutions of sodium hydroxide. For all concentrations over a wide range, viscosity, μ, 0.8 to 4.0 centipoises, is related to temperature, t, 20° to 35°C by the equation

$$\log (\mu - 0.4) = a + b\,t$$

where a and b depend on concentration in an unknown manner. Values of μ and t for various normalities are given in the following table:

Normality	20°C	35°C
	Values of μ	
1	1.234	0.887
2	1.545	1.096
3	1.963	1.373
4	2.548	1.739
5	3.330	2.216
6	4.370	2.830

Draw parallel axes for the t and μ scales at any convenient distance apart, say 16 cm. Choose a modulus of 1.5 cm for the t scale and construct the natural scale 1.5t from 20 to 30 upward on the t axis. For values of μ of 0.8 to 4.0, $\mu - 0.4$ varies from 0.4 to 3.6. Choose a modulus of 25 cm and construct the scale 25 log ($\mu - 0.4$) upward on the μ axis.

Broken lines on Figure 6 (*P.* 77) show how the normality scale is determined. For normality of 3, for instance, connect $\mu = 1.963$ and $t = 20$ (read from the table) with a straight line. Then connect $\mu = 1.373$ and $t = 35$ with a straight line. Their intersection marks the point where the normality is 3.

Proceed in the same manner to determine points for the other normalities. Connect these points with a smooth curve to define the normality scale. Since this scale is nearly uniform, subdivision is simple.

In the case of a resultant non-uniform scale, measure distances from one extremity of the scale to various points, plot these distances against the numbered values, read distances to desired subdivisions from the plot, and lay these distances off on the non-uniform scale.

If the μ and t scales are constructed in opposite directions, the normality scale would lie outside these axes, a situation that is sometimes desirable.

For a more complete treatment of line coordinate charts, fortified with underlying theory, see the author's "Nomograph and Empirical Equations," Chap. 10, Reinhold Publishing Corp., New York, 1955.

For every process fluid, there's a better Crane valve

These valves on corrosive steam* lasting 4 times longer

What's par for valve life on tough, corrosive steam? Read how Gardner Board and Carton Company's Lockland Mill at Cincinnati raised it from one week to 12 . . . then with "Craneloy 20" valves, to more than a year's service.

The installation is on 150 psi. steam to a siphon tank of 66° Baumé sulphuric acid. The acid is mixed with steam to spray ink off screens in a wet end process.

On occasion the siphon line is left in the vat, causing condensation which forms a vacuum. This pulls acid back into the line and through the valve.

With brass valves in the line, the corrosion forced replacement every week. Another make special alloy valve was tried; it lasted 12 weeks. Better, but not good enough!

Then "Craneloy 20" globe valves were installed—more than a year ago. With more than 4 times longer service given, these highly engineered Crane alloy valves still hold tight and operate smoothly. A good valve to know to help you combat corrosion.

**This "Craneloy 20" valve is not ordinarily recommended for steam, but here the sulphuric acid mixture provides enough lubrication to retard galling.*

GET FULL FACTS . . . on "Craneloy 20" and other Crane quality alloy valves and fittings. Ask your Crane Representative for Circular AD-2080, or write to address below.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

Check 3402 opposite last page.

Silicone rubber seals reduce repair costs in utility plant

Stop seal-replacing headache in flexible couplings

Problem: Conventional rubber seals lasted only about six months in the flexible couplings of the hot coal-handling lines at the Astoria plant of Consolidated Edison Company of New York.

Occasionally, failures occurred within a week. Although the seals cost little, labor costs for replacement ranged from 50 to $100.

The plant has a total of 234 expansion joints — one every 10 ft — in the lines running from ball mills to boiler fireboxes. Temperature of the pre-heated pulverized coal in the lines is about 150°F, while ambient temperatures, especially near the boilers, range as high as 325°F.

Silicone rubber seals have paid for themselves in short period of time

Solution: Concerned over this high cost of maintaining the joints, company tested and decided to install higher cost seals made of silicone rubber.

Results: The silicone rubber seals have already lasted over a year and are still in use. Although initial cost was higher than the conventional rubber seals, the new seals have already paid for themselves several times over by eliminating replacement costs.

(Silicone rubber seals were fabricated by the Niagara Rubber Co., Plainfield, New Jersey.)

Check 3403 opposite last page.

(Silastic silicone rubber is produced by Dow Corning Corp., Midland, Mich.)

Check 3404 opposite last page.

quality
proved
DARNELL
CASTERS AND WHEELS

RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

RUST-PROOFED . . . by zinc plating, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Quick grease-gun lubrication provides easy maintenance.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

FREE MANUAL

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How to Make Nomographs – VI

From page 75

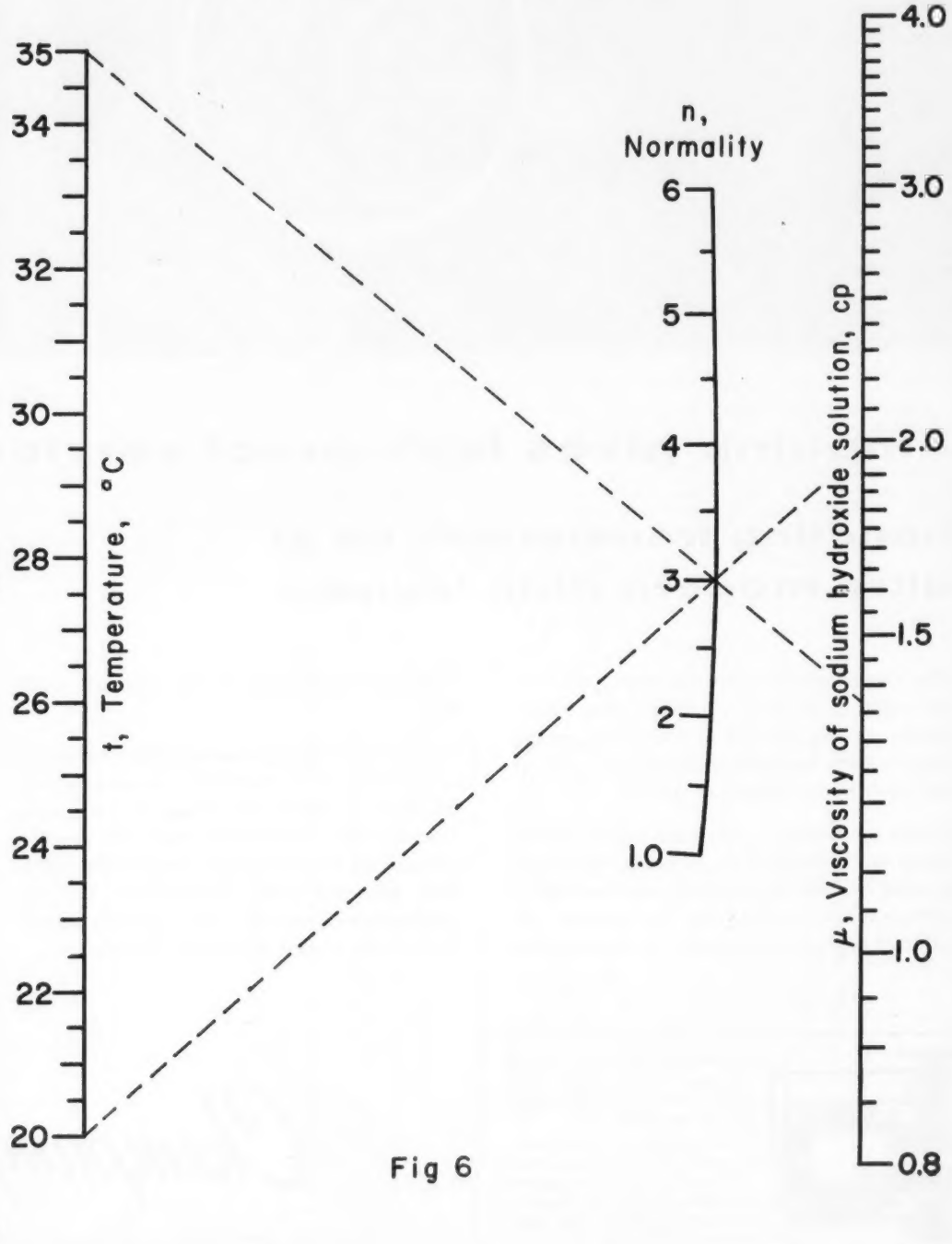
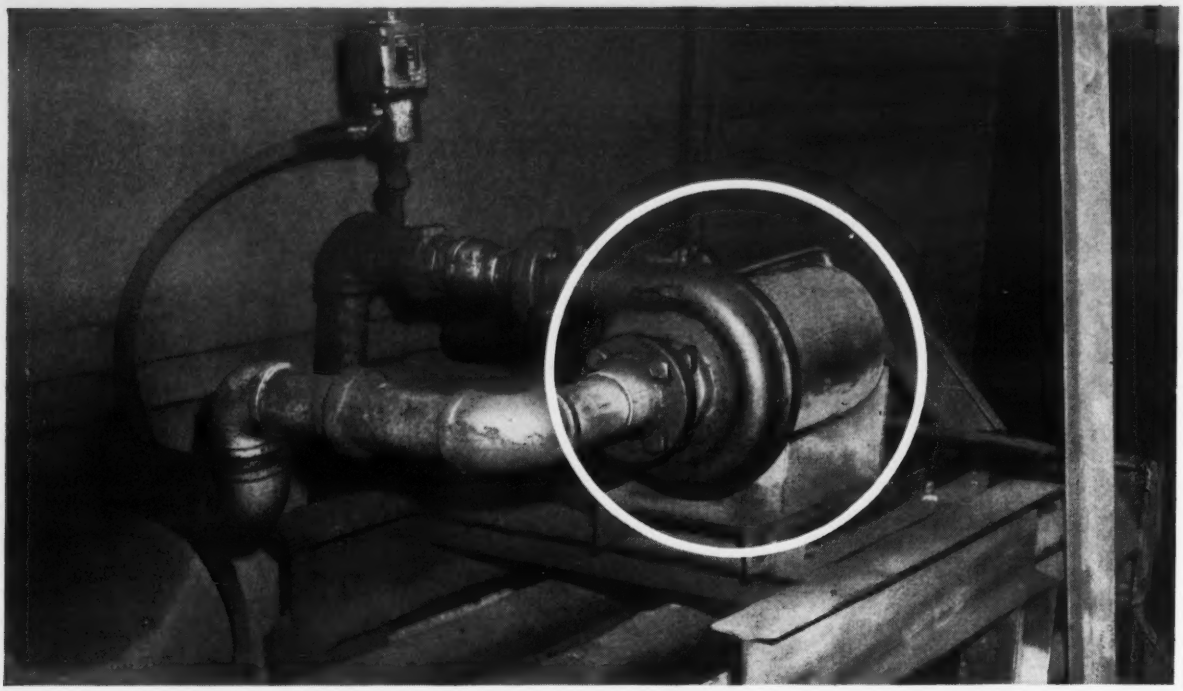


Fig 6



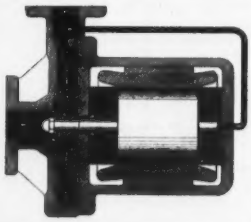
Chempump gives leak-proof service

handling transformer oil at ultra modern Ohio foundry

This *Chempump* circulates oil through the heat exchanger of an electric furnace power transformer. It was installed at one of the world's most modern foundries in September, 1955. *It has required no maintenance to date.*

Unlike conventional centrifugal pumps, *Chempump* can't possibly leak, no matter what fluid is being pumped. It's a totally enclosed unit—without seals, stuffing box or packing. No external lubrication is needed, for bearings are constantly lubricated by the pumped fluid itself.

Chempump's long-term dependability cuts process pumping costs everywhere. Learn how you can gain its many advantages in your own fluid handling application. Write for specific information to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



Chempump combines pump and motor in a single, leak-proof unit. No shaft sealing device required.

U.L. approved. Available in a wide choice of materials and head-capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

Chempump

First in the field...process proved

Check 3406 opposite last page.

NEW SOLUTIONS

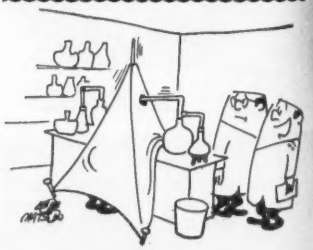
Lower handling cost of anhydrous $AlCl_3$

A new method of transporting Solvay's anhydrous aluminum chloride in air-tight bulk trailers should provide substantial customer savings. Previously the material has been available to the industry only in small hermetically sealed steel drums.

One-man operated telescopic hoist provides efficient dumping angle of 45°

The bulk trailer consists of a cylindrical steel body approximately 26 feet long. Vehicle can carry 18 tons of product. One-man operated telescopic hoist provides a maximum dumping angle of 45 degrees during unloading. The dump-tank trailers are owned and operated by Shipley Transfer, Inc., of Reisterstown, Md.

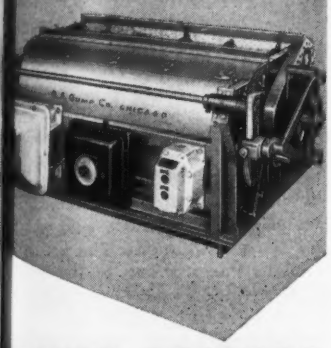
(Method of transporting anhydrous aluminum chloride was developed by Solvay Process Div., Allied Chemical & Dye Corporation, 61 Broadway, New York 6, N. Y.)



"I think Henry is onto something."

egulate Bulk Feeding—

and prevent production choke-ups!



RAVER FEEDERS

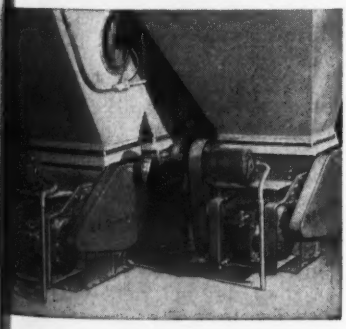
ow available with utomatic timing controls

revent overloading of grinders, sifters, ixers and other production machines. Accurate Draver Feeders regulate the low of dry free- or nonfree-flowing roducts . . . keep processing equipment perating at most efficient capacity . . . revent machine failure and downtime. Timing controls are available, for feed- ng to continuous processes at automatic ntervals.

Dependable and durable, Draver Feeders are made in more than 100 sizes nd models, with capacities from min- te quantities up to thousands of pounds er hour. Original cost and operating xpense are low, compared with the roduction losses they prevent.

What is your bulk feeding problem? Write our engineering department for a olution, without obligation.

ver "Micro-Master" Feeders, mounted at r level, feed to mixing equipment below.



FEEDING · MIXING · SIFTING · WEIGHING · PACKING EQUIPMENT FOR THE PROCESS INDUSTRIES

B. F. GUMP CO.

Engineers & Manufacturers Since 1872

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Check 3407 opposite last page.

CUT HERE AND FILE

Maximum Storage Volume for Liquefied Propane and Isobutane

CLIFFORD L. DUCKWORTH, East Alton, Ill.

The accompanying nomograph, designed to determine maximum liquid volume (as recommended by National Fire Protection Assn.) of liquefied propane and isobutane to be placed in storage tanks, is based on the formula[2]

$$V = \frac{CD}{GF}$$

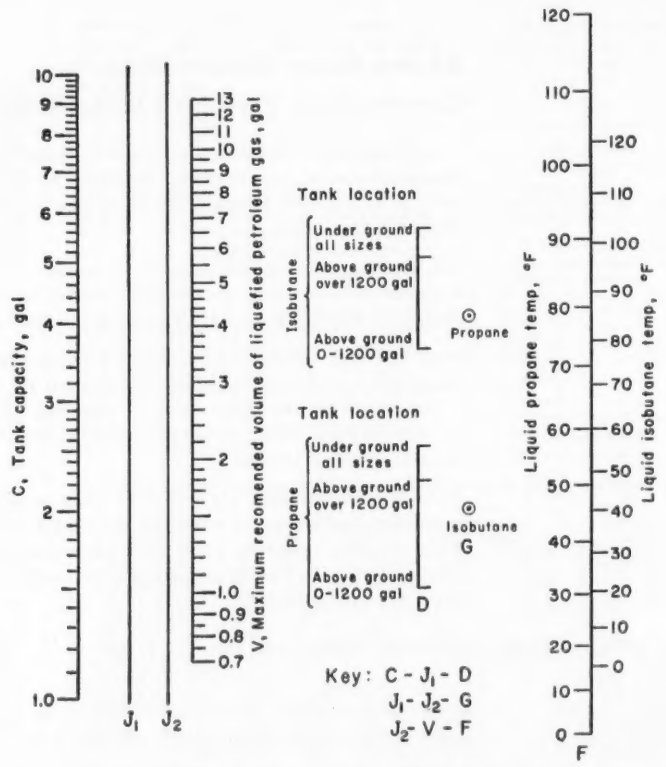
where V = maximum liquid volume, gal
C = capacity of tank, gal
D = specific gravity of gas relative to water at 60°F, scaled on chart in terms of location and size of tank
G = specific gravity of the liquefied petroleum gases at 60°F, limited to points for propane and isobutane
and F = correction factor for temperature of gas being loaded, scaled on chart in terms of temperature.

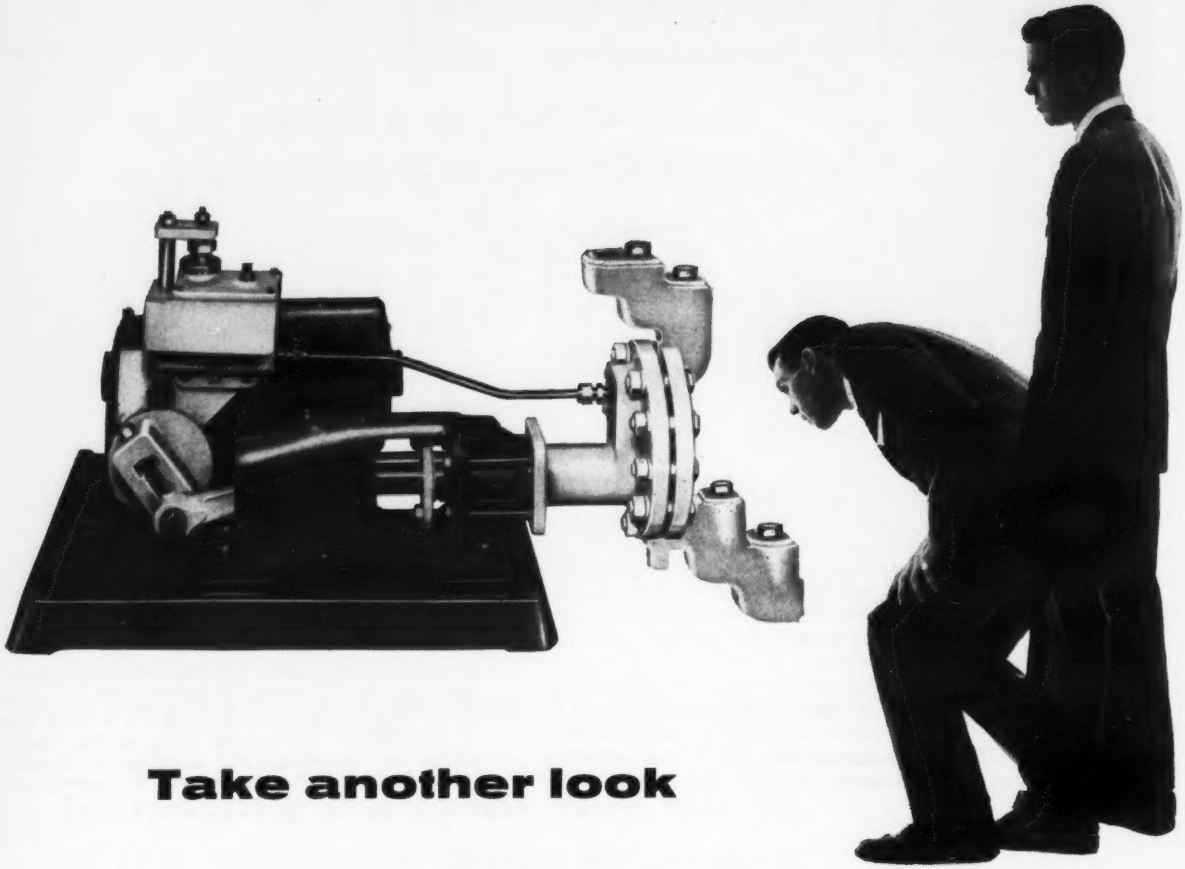
To use the nomograph, which was constructed through application of well-known methods[1], connect tank capacity C with tank location D. Align the intersection on J_1 with the propane or isobutane point G; then connect the intersection on J_2 with the temperature scale F for the particular gas. Intersection on the V scale shows the volume of liquefied petroleum gas to be loaded. The C and V scales are related and can be used for any capacity, provided the same multiple factor is used on both. **Note:** Points on D and G scales are not for same gas. Lower points on D scale are for propane, while lower points on G scale are for isobutane.

LITERATURE CITED

1) PERRY, J. H., editor, "Chemical Engineers' Handbook," pp 100 — 105, 3rd ed., McGraw-Hill Book Co., New York, 1950.

2) "Standards of the National Board of Fire Underwriters for the Storage and Handling of Liquefied Petroleum Gases," Pamphlet NBFU 58, Appendix C, p. 53.





Take another look

At the New Milton Roy Controlled Volume Diaphragm Pump*

. . . For chemical metering applications requiring leakproof pump construction. *Available as complete new units or in kit form to convert existing packed-plunger Milton Roy pumps.*

Air binding in these diaphragm pumps is eliminated by positive mechanical action, once each stroke, to bleed air or vapor from the hydraulic fluid.

Step-Valve or column valve designs are available for pressures to 2000 psi and capacities from 1.1 to 138 GPH . . . manual or automatic 0-100% capacity adjustment . . . liquid ends interchangeable with Milton Roy packed-plunger pumps.

Take the Milton Roy approach to your metering and pumping problems . . . write for detailed information to Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives throughout the world.

*Patent applied for.

Controlled Volume Pumps • Quantichem Analyzers
Chemical Feed Systems • Anders Air and Gas Dryers

milton Roy
CHEMICAL INSTRUMENTATION SYSTEMS

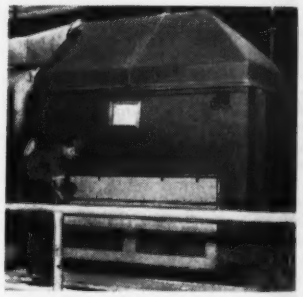
Check 3408 opposite last page.

U_3O_8 production speeded with twin-drum dryer

By-passes need for scale-up or development work

Problem: An efficient method of drying a water mixture of uranium oxide precipitate was sought by Pronto Uranium Mines Limited, Algoma Mills, Ontario. Time limitations prevented developing drying techniques for this material with laboratory and pilot scale equipment. The solution to the problem had to be obtained quickly under full-scale operating conditions.

Solution: After investigating various other processes, equipment, and operating economics, it was decided to install a twin-drum dryer with



Twin-drum dryer turns out as much as 7000 lb of powdered uranium oxide per day

a splash-feed system. Unit occupies floor area of about 10x15′ and is 13′ high. Its two drums are only 32″ in diam and 72″ long.

In operation, slurry is fed into a pan below the drums. Two revolving spiked feed-rolls dip into the slurry and splash it on the undersides of the rotating drums which are about 1″ apart.

Drums are heated by 100-psi steam which evaporates the water and leaves the dried product to be removed in powder form by knives on opposite sides of the drums. Drum and feed-roll speeds are adjustable. Knife pressure can also be regulated.

Results: Dryer produces as much as 7000 lb of U_3O_8 precipitate from 65,000 lb of slurry in one day. This is the average daily production from 1500 tons of ore. Water con-

New uses found for **Metallic Oxide Pigments**

Today new product planners and production engineers are finding uses for the unique physical and chemical properties of metallic oxides which are surprisingly far afield from traditional usages.

Below is a review of their characteristics. Look them over. You may get the germ of an idea which will lead to the improvement of existing products ... or to the reduction of new product manufacturing costs.

We'll be glad to cooperate with you in exploring the possibilities. Address Dept. 75, C. K. Williams & Co., Easton, Penna.

Name	Properties
Pure Red Iron Oxides and Kroma Reds	Fe_2O_3-98.5% SpG.-5.15 Color—Salmon to purplish red
Pure Yellow Iron Oxides	$Fe_2O_3.H_2O$-99% SpG-4.03 Color—Lemon to dark orange
Pure Black Iron Oxides	Fe_3O_4-96% min. SpG.-4.96 Color—Blue Black
Pure Chromium Oxides (and Hydrates)	Cr_2O_3-99% SpG.-5.20 Color—Light to dark green
Natural Oxides—Ochers, Umbers, Siennas, Metallic Browns, Red Oxides	Wide range of ferric oxide content and red, yellow and brown colors
Venetian Reds	Fe_2O_3-40% SpG.-3.45 Color—Light to med. red
Cuprous Oxide	Cu_2O-97% min.
Extenders—Barytes, Calcium Carbonate, Calcium Sulfate, Silica	Wide range

Characteristics

Composition: The basic colors of the iron and chromium oxides are determined by chemical composition. Reds are ferric oxide (Fe_2O_3); yellows, hydrated ferric oxide ($Fe_2O_3.H_2O$); blacks, ferro-ferric oxide (Fe_3O_4); and greens, chromic oxide (Cr_2O_3). All these compounds are chemically stable and light permanent.

Particle Shape: Physical properties such as oil absorption and suspension characteristics are dependent on particle shape, controlled by manufacturing processes.

Size: Color range is controlled by particle size—average size increases as color darkens. Uniformity of size determines brightness.

Purity: Freedom from impurities is essential for superior pigment properties and to prevent deleterious effects in end-products. Control of soluble salts, manganese and copper content are an important part of the Williams manufacturing operation.

WILLIAMS
COLORS & PIGMENTS

C. K. WILLIAMS & CO.
East St. Louis, Ill.
Easton, Penna. • Emeryville, Calif.

Check 3409 opposite last page.

tent is reduced by the dryer from 75-85% to 5%.

Dryer has operated so satisfactorily that company has installed a second unit of same size and capacity. Other uranium ore processing companies in the area have also started operating with the same kind of dryers.

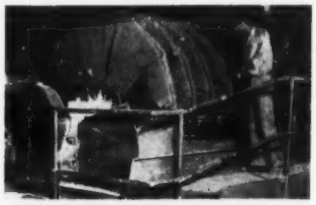
(Twin-drum dryers are product of Buflovak Equipment Div. of Blaw-Knox Company, 300 Sixth Ave., Pittsburgh, Pennsylvania.)

Check 3410 opposite last page.

Filter cloth life boosted from 1 to 9 months in cement plant

Switch to synthetic fabric, cuts material, labor costs

Problem: Filter cloth costs were excessive at Lone Star Cement Company, Hudson, New York. Conventional cloth used on company's rotary drum and disc sector-type units would only last about 30 days before they had to be replaced. Shutdowns were



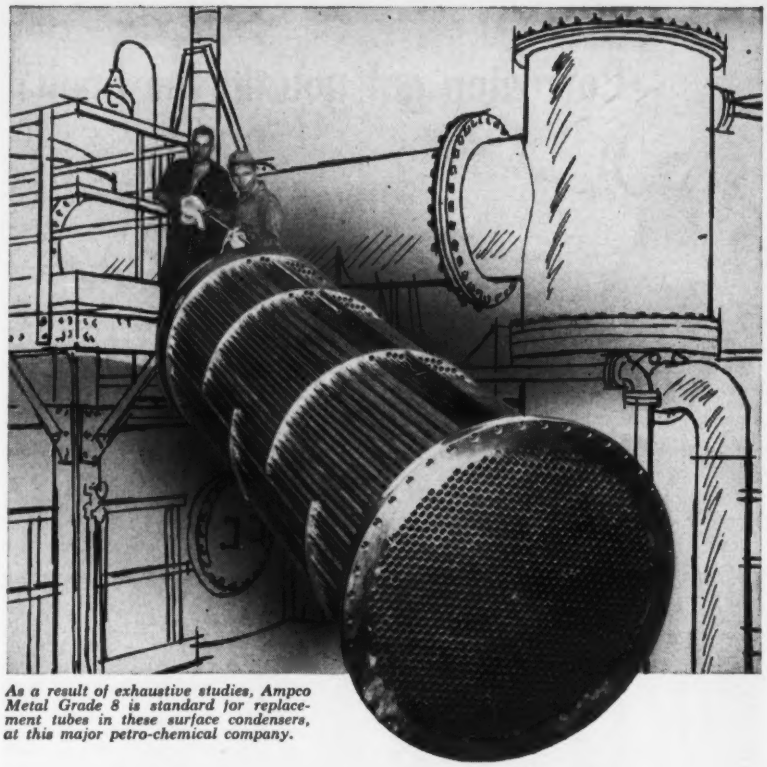
Filter bags on disc-type unit resist alkalis, acid, and abrasion

time-consuming and costly, since filters normally operate on a 24-hr basis.

The slurry being filtered is a ground mixture of limestone, clay, and water. It contains considerable alkali dust that is received from the electrostatic precipitator used for cleaning the kiln gases.

Filter cake removal, on a continual basis, subjects the fabric to constant abrasion. Furthermore, filters are regularly washed with HCl, giving the cloth additional punishment.

Company uses a battery of nine large filters at its Hudson



As a result of exhaustive studies, Ampco Metal Grade 8 is standard for replacement tubes in these surface condensers, at this major petro-chemical company.

Reduces corrosion-erosion of 5% sulfuric-acid vapors

On-job tests prove deterioration rate for Ampco Metal tubing one-third lower than for copper

The cooling of overhead acid vapors discharging from an H_2SO_4 concentrator spelled trouble for one petrochemical company. After six months, the top ends of the copper tubes in surface condensers had deteriorated due to corrosion-erosion. It was decided to test other materials in this service.

In one 34-day test, specimens were placed at the entrance to the tubes. Results showed that Ampco Metal Grade 8 would give about 50% longer service than the original copper tubes.

A later 45-day test — with samples placed away from tube sheets to minimize erosion — showed Ampco Metal Grade 8 superior to other copper-base and stainless alloys.

The excellent heat-transfer rate and outstanding corrosion resistance of Ampco Tubing provide highest efficiency in many types of equipment. Write us concerning *your* problem.

Corrosion Rate—IPY	
...In 34-day high-velocity test:	
Copper	0.022
Ampco Metal Grade 8	0.015
Carpenter 20	0.056
...In 45-day corrosion test:	
Ampco Metal Grade 8	0.0046
Aluminum brass	0.009
Silicon bronze	0.018
Type 316 (high Mo)	0.020
Hastelloy B	0.0038
Alleghany	0.008
Nionel	0.0019

In both tests ...
Temperature was 200°—270°
Acid concentration was 0-5% H_2SO_4
Data from Chemical Engineering, Feb., 1957

PI-3

For ready reference, see the 12-page Ampco insert in Chemical Engineering Catalog.

AMPCO®
THE METAL WITHOUT AN EQUAL

AMPCO METAL, INC., Dept. CP-2, Milwaukee 46, Wis., West Coast Plant: Burbank, Calif.

Check 3411 opposite last page.

Corrosion got you on the hook?

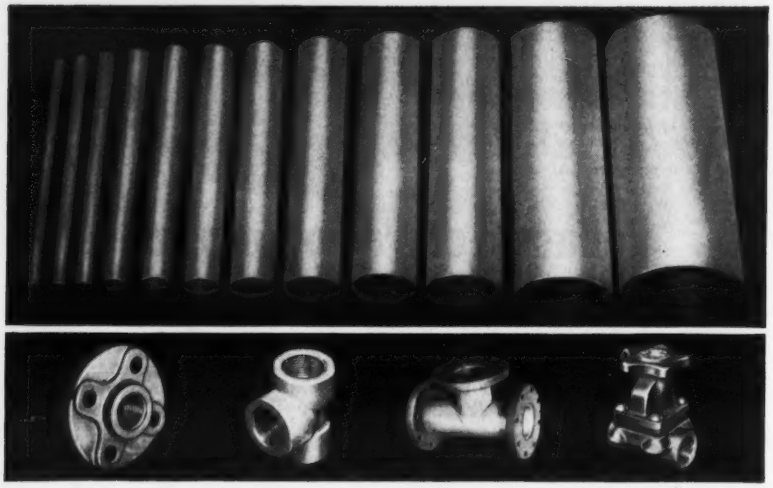
INVESTIGATE

Van-Cor

PIPE, FITTINGS, VALVES

made of Rigid, Unplasticized

POLYVINYL CHLORIDE



ADVANTAGES:

Resists Corrosion of Hundreds of Industrial Acids & Alkalies
Light in Weight (½ that of Aluminum)
Easily Installed; High Tensile Strength; Low Flow Resistance
Readily Formed, Machined, Threaded and Welded

TWO TYPES:

1. Chemical Resistant, NORMAL Impact (Van-Cor 1)
2. Chemical Resistant, HIGH Impact (Van-Cor 2)

AVAILABLE FORMS:

Pipe: ¼″ thru 12″ diam. (10 or 20 ft. lengths)	Sheets: 1/16″ thru 2″ (48″ x 96″)
	Bar Stock: ¼″ thru 2″ (10 ft. lengths)
Fittings: ¼″ thru 12″	Custom Fabrications
Valves: ½″ thru 3″	Custom Extrusions

Request Complete Catalog containing detailed specifications, diagrams, flow charts, chemical resistance tables and installation data.

INDUSTRIAL DIVISION OF...

COLONIAL PLASTICS MFG. CO.

Subsidiary of THE VAN DORN IRON WORKS CO.

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Check 3412 opposite last page.

NEW SOLUTIONS

plant. Installation turns out about 6000 barrels of "Incor" brand Portland cement daily, including special types for highways, heavy concrete construction, and masonry. Lone Star has 15 plants in the US and 6 overseas.

Solution: After a thorough investigation, company switched to Dynel filter cloths, woven from Union Carbide Corporation's acrylic fiber.

In the drum filter, the cloth covers the perforated metal circumference of the hollow drum, which is 8 ft in diam. The disc-type filters are made up of a group of 10 discs, each having a diam of 8½ ft. Each sector is covered by a heavy filter bag.

Results: The new filter cloths last, on the average, 9 times longer than the previous material — giving about 9 months of service instead of only 30 days. Of special significance is the high life-to-cost ratio of the acrylic fabric in reducing the need for frequent shutdowns. The cloths have an average efficiency of 99% without clogging.

(Dynel filter bags and cloth were furnished by Albany Felt Company, Albany, New York.)

Check 3413 opposite last page.

(Further information on Dynel acrylic fibers may be obtained from Textile Fibers Department, Union Carbide Chemicals Company, Division of Union Carbide Corporation, 30 E. 42nd St., New York, New York.)

Check 3414 opposite last page.

Air pollution control — case histories

Illustrated eight-page bulletin features four problem-solution case histories of typical catalytic oxidation installations in organic finishing and drying, chemical processing, oil refining, and food processing industries. Other fields of successful application are listed. Air pollution control bul — Oxy-Catalyst, Inc., Wayne, Pennsylvania.

Check 3415 opposite last page.

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dating?
coding?

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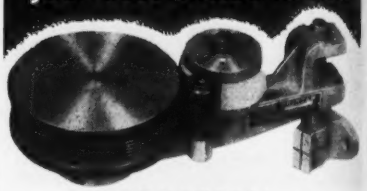

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Industrial's WHIPPET Marker is the answer to fast, economical in-plant imprinting of bags, cartons, boxes, rolls, cans and the like. Friction motivated, it takes speed from and is controlled by your conveyor line operation. You mark containers as you use them, during production runs. Self inking, and using easily interchanged rubber type, the WHIPPET is solidly built to give years of trouble-free service. Easily installed out of the way on your present production line, it will quickly repay its original cost in extra savings and performance.

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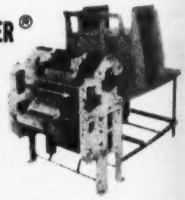

—for automatically imprinting cartons and multiwall bags at production speeds up to 3,000 per hour.

RAINBOW Trans-leaf Coder® — for automatically marking any material that takes hot dye transfer impressions.

SPECIALS — Our Specialty. We make and supply all types of special marking equipment, custom designed and built for your individual needs.

ime INDUSTRIAL MARKING EQUIPMENT company, inc.
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Check 3416 opposite last page.

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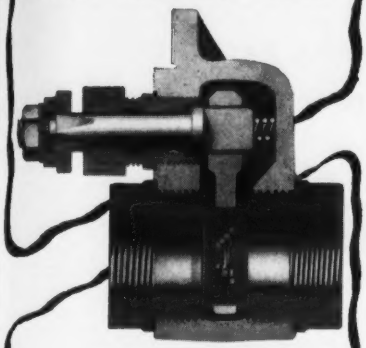
Okadee
VALVES
NON-LUBRICATED



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Available in Stainless Steel or Steel, Chemically Nickel Coated

You can select Okadee Valves for flow by pipe size — and get full-flow and positive shut-off with virtually any liquids and gases.

Quick-opening, metal-to-metal disc valves and seats require no lubrication — virtually no maintenance for hundreds of thousands of operations . . . Real valve *performance* and *service.*

FACTS AND FIGURES

. . . on Okadee Valves will be sent promptly on request. Sizes ½" to 8"; A.S.A. dimensions; screwed or flanged. Valve seats and discs Stellite or stainless steel; your choice of operators.

• Write for Bulletin CP6

Okadee COMPANY
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Check 3417 opposite last page.

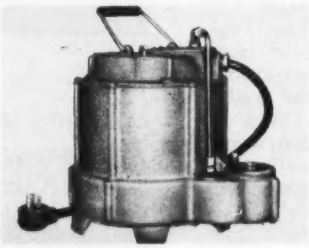
Pumps serve six years, dependably handling acid water seepage

Cables, wireways protected by submersible units

Problem: Underground wireways and pipes at American Cyanamid's Bound Brook, N. J., plant were subject to considerable ground-water seepage. Since ground water was on acid side from processing operations, sump pumps that had been installed to control seepage corroded and failed.

Greater dependability of pumps was necessary since seepage completely submerged cables when pumps did not operate properly.

Solution: About five to six years ago, American Cyanamid installed automatic multi-purpose submersible pumps with



Submersible pump handles acid ground-water seepage

all surfaces exposed to fluid being of bronze, brass, stainless steel, carbon, neoprene, ceramic, or Buna-N. Units have semi-open impeller and completely sealed bearings and shaft.

Capacities are 3300 gph at 10-ft head and 400 gph at 22-ft head.

Results: Corrosion of sump pumps with consequent pump failure has been eliminated. During the five to six years these units have been in service they have operated dependably to protect cables and underground piping from deteriorating effect of acid ground-water seepage.

(Multi-purpose submersible pumps are a product of Kenco Pump Div., American Crucible Products Co., 1305 Oberlin Ave., Lorain, Ohio.)

Check 3418 opposite last page.

This Tank Car Makes Money In Three Ways

1—It is on active duty, delivering chemicals; **2**—its handsome appearance does credit to its owner; **3**—its Epoloid coating will last far longer than other leading tank car coatings.

For an Epoloid coating is hard, yet flexible—resists alkalis, acids and solvents—withstands temperature extremes—has stable color pigments—is easily maintained.

EPOLOID CUTS COATING COSTS IN HALF

Check your traffic records—chances are your tankers need refinishing every 24 months. This is costly. With Epoloid, you should more than double coating life. Epoloid keeps tankers looking like new when washed periodically. Touch-ups of abrased areas can be made quickly, simply.

EPOLOID-COATED TANKERS NOW SERVE EIGHT MAJOR CHEMICAL COMPANIES

Epoloid-coated tank cars and wagons—in service for eight major chemical companies—carry such diversified chemicals as hydrochloric acid, carbon disulfide, 73% caustic, perchlorethylene, trichlorethylene, grain fumigants, vinyl chloride, oxychloride, phosphorous chloride, soda ash, sodium bisulphide, vinyl latex and phenol.

Let us prove that Epoloid-coated tank cars and wagons can make money for you. Write:

ROWE PRODUCTS INC.
College Avenue and Hyde Park Boulevard
Niagara Falls, New York

Specialists in protective coatings to the chemical process and allied industries since 1921

Check 3419 opposite last page.

Customer Service

From page 31

of the departments are the tacticians who snap out the day-to-day orders that put the plans into execution.

The committee meets for one full day each, week, or oftener if special situations arise. All decisions are made by a majority vote, with the limitation that it takes a minimum affirmative vote of four to pass any resolution.

In addition to sitting as a committee responsible for the operation of the company, each member of the Executive Committee serves as the executive adviser for various company activities in which he is most experienced. For example, T. C. Davis is advisor on financial matters and purchasing; David H. Dawson on development, salaries, and personnel; and Henry B. du Pont on engineering. President Crawford Greenewalt is adviser on public relations.

Finance Committee

The other major committee responsible to the Board of Directors is the Finance Committee. It also consists of eight members. Some are active company executives, some are men who have retired as full-time officials but who still lend the weight of their experience and judgment, while some are substantial stockholders who are interested in the company but not active in day-to-day affairs. President Greenewalt is also a member of this committee.

Function of the Finance Committee is to handle all financial affairs of the corporation and exercise supervision over all its expenditures beyond a certain amount. In effect, it takes charge of all finances of the company, and of all its earnings. The committee meets twice monthly.

In some ways analagous to that effected in our federal government, there is an effective system of checks and balances. The Executive Committee keeps close tabs on the activities of the manufacturing departments, and the Finance Committee, through its review of expenditures above

MIN CHEMISTRY at work

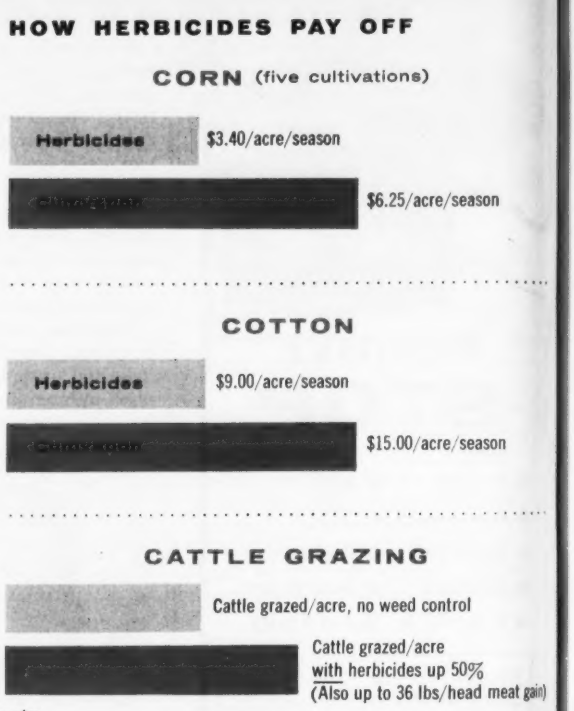
...news briefs

ON THE CREATIVE USE OF M & C PROCESS MATERIALS

***Granular Herbicides . . .**

chemical weed killers with a bright future on farms, highways, railroads, plant sites

Granular herbicides are easy to make, package, store, handle, apply. With little drift, they pelt through foliage onto the soil. They offer physical and chemical selectivity. Larger payloads can be carried, no water need be hauled or supplied, application methods can vary to suit the case. Popularity has them in use on farms, orchards, right-of-ways for highways, railroads and utility lines, and in industrial tank farms. M & C's Granular Attaclay is the most widely-used base material—well worth looking at. This is a *starred item.* Use the coupon.

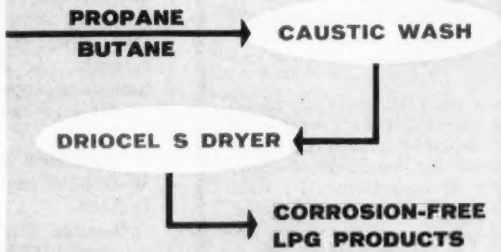


Data Based On Professional Entomological Estimates

Petroleum Refiners

get corrosion-free LPG products with Driocel S desiccant

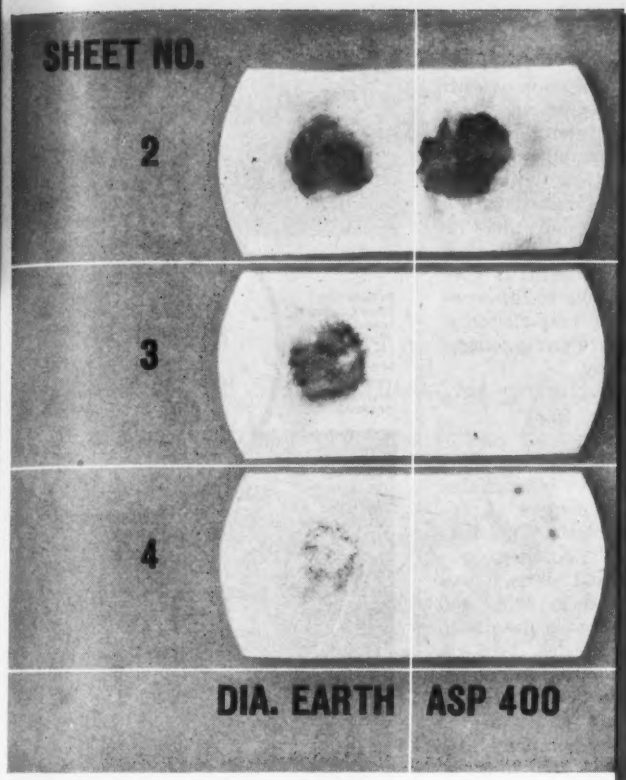
M & C developed this new desiccant to give 5-way help to LPG processors: (1) thorough drying (2) absence of corrosive reaction with sulfur compounds which escape caustic wash (3) no polymerization of unsaturates; (4) low cost (5) long service life. Specific properties of this product also suggest its use in drying chlorinated and fluorinated hydrocarbons.



MINERALS &

CORPORATION OF AMERICA

Leaders in creative use of non-metallic minerals



*Adhesive Users: here's superior penetration control to improve products and lower costs (test details on request)

Photo shows superiority of M & C's ASP 400 additive in keeping glue at the glue line (it hardly went beyond Sheet 2 of the stacked papers). Ability of the ASP's to prevent adhesive migration gives adhesive users such positive advantages as: increased mileage; great bond strength; dry, hard products; low costs. Would you like to extend these good points to your glue operations? If one, or both, of the faces you are gluing is porous, it can be done. This is a *starred item*. Use the coupon.

Reinforced Plastic displays doubled impact strength with Aluminum Silicate Pigment filler

Plastic slab under test is a formulation destined for use in making caster wheels up to 12" dia. for industrial trucks. High impact strength is a must. When M & C's ASP filler was introduced, the ASTM 256—56 value jumped to 3.44, just about double industry standard of 1.8. Also improved were the resistance to abrasion and water absorption, and the heat distortion factor.

Manufacturer gets positive production and personnel advantages from thirsty SOL-SPEEDI-DRI® oil and grease floor absorbent

Dust is *taboo* in a miniature precision parts plant. In the operation shown, hardness and dustlessness of Sol-Speedi-Dri help maintain 0.0005" tolerance, cut rejects, improve production, boost personnel morale by keeping plant floors clean, safe and dry.

Use this quick two-check coupon ▶

✓ your product interest . . .
✓ what you need to get tests started . . . we'll fill your requests immediately.

For more data, see Chemical Materials Catalog Pages 358-362.

CHEMICALS

6260 Essex Turnpike, Menlo Park, New Jersey

Export Department: Room 150 Garden State Parkway, Menlo Park, N.J. (Cable Address: "MINCHEM")

MINERALS & CHEMICALS CORPORATION OF AMERICA
6260 Essex Turnpike, Menlo Park, N. J.

I'm interested in:
☒ Granular Herbicide carrier; ☐ Driocel S desiccant;
☐ Sol-Speedi-Dri; ☒ Adhesive additive;
☐ Reinforced Plastic filler

Please send, without obligation:
☐ data; ☐ samples; ☐ prices; ☐ technical representative

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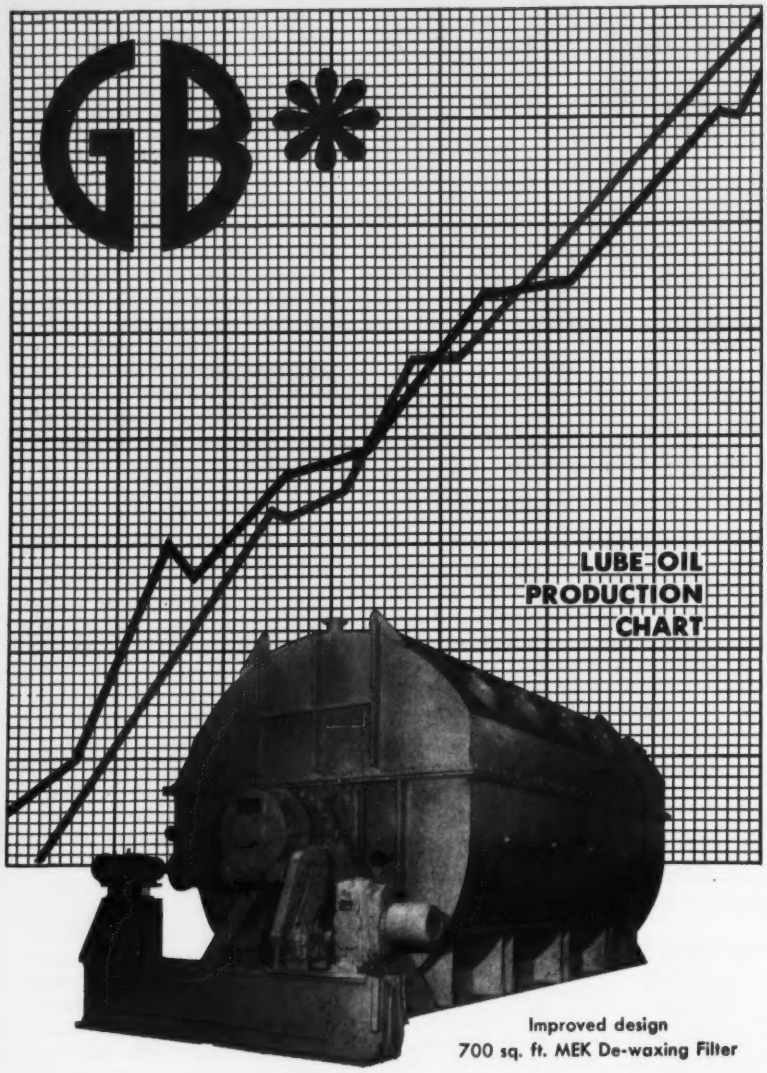
Check 3420 opposite last page.

a specified amount, has a check on the Executive Committee.

Smaller committees of the Board of Directors are the Committee on Audit, and the Bonus and Salary Committee. The Audit Committee, consisting of three Board members, engages independent public accountants to review the company's accounting procedures, certifies as to correctness of financial statements, and makes such recommendations as appear necessary. The Committee on Bonus and Salary, consisting of five members, none of whom is eligible for a bonus, has the power and authority vested in it by the company's Bonus Plan. It also determines the compensation of the chairman of the Board of Directors, members of the other three committees of the Board, the president, and vice presidents of the company.

There are 11 manufacturing departments: Elastomer Chemicals, Electrochemicals, Explosives, Fabrics and Finishes, Film, Grasselli Chemicals, Organic Chemicals, Photo Products, Pigments, Polychemicals, and Textile Fibers. Each department operates very much like an independent company, but is responsible to the president and Executive Committee, and draws its broad policies from them. To a surprising extent, these manufacturing departments function as independent entities. They buy and sell among themselves, generally on the same terms quoted to outside concerns. Occasionally their products compete with each other in the same market.

A general manager is appointed by the Executive Committee to run each department. He in turn appoints an assistant general manager, with the Committee's approval. The general manager is, as a rule, a man who has worked up through the department involved. In almost all cases he is a technically trained man. He is fully responsible for the activities of his department and for the company's investment in plants, laboratories, processes, and other facilities under his management. He has practically complete authority over all items which enter into his



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700 sq. ft. MEK De-waxing Filter

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Over 25 years of experience assure you that Goslin-Birmingham can produce the best de-waxing filter to fit your requirements regardless of the process.

G-B has manufactured more de-waxing filters than any other producer... by many times the largest volume in the industry.

GB
GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM, ALABAMA

Check 3421 opposite last page.

Customer Service

From preceding page

costs, as well as authority with respect to selling prices. He is given power commensurate with his responsibility, which is a basic concept within the du Pont organization. If a man is given a job then he must be equipped with full authority to handle it; to give him less would be to dilute or diminish his responsibility. This is the du Pont management philosophy.

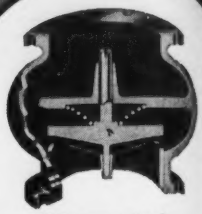
"Time to Think"

In no sense are members of the Executive Committee directors or managers of departmental projects. This feature of the du Pont organization was unusual when it was first established in 1921, and is to some measure unique in management circles today. Executive Committee members are to be free to give all their time and effort to the business of the company as a corporate unit, and thus be able to consider all questions, as Irenee du Pont put it, without bias or prejudice. A former Harvard Business School dean has characterized the du Pont organization as unique in having a group of top executives with "time to think," without being burdened with daily administrative duties. With the exception of Mr. Greenewalt, all members of the Executive Committee are vice presidents. All are directors of the company.

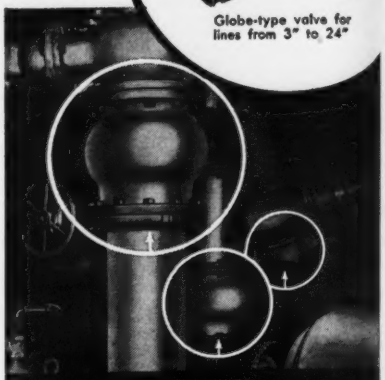
Essentially, du Pont is an organization dedicated to individual initiative, in which new ideas and new developments find full expression. In any field so highly competitive as the chemical industry, no company could long keep its place without a venturesome spirit. It is this spirit which the du Pont Company's organization is designed deliberately to foster and encourage. And it is through operations such as the customer service center at Chestnut Run, where new ideas and developments find full expression, that the combination of vision, research, creativity, and service have been made to pay off for du Pont — and for its customers.

Safe, Silent Piping Systems for Pulp and Paper Mills

At Longview Fibre Company, Longview, Washington, valves installed in both vertical and angular positions.



Globe-type valve for lines from 3" to 24"



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FLANGED
Silent
CHECK VALVES

Systems processing ordinary water and black, green, white, pink and sulphite liquors are protected from water hammer damage by these *Silent* Check Valves. By closing instantly when flow reversal starts, or when flow is zero, they effectively control surge pressures.

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No. 654 on the Valves
No. 851 on Cause, Effect and Control of Water Hammer

THE WILLIAMS GAUGE CO., INC.
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Check 3422 opposite last page.

US and World
PETROCHEMICALS SECTION OF CHEMICAL PROCESSING

With five billion dollars already invested in plants in the United States and rapid growth occurring all over the world, the future looks bright for the –

PETROCHEMICAL INDUSTRY

. . . where is it going and how fast?

- **Recent research study reveals vigorous development of petrochemicals in 20 or more countries . . . indicates petrochemical industry will top growth rate for either the petroleum industry or the chemical industry in years ahead**
- **Plastics and synthetic rubber will spur expansion, with fibers not far behind**
- **US leads now with 400 petrochemical plants, but other countries are pushing hard to capture markets**
- **As the petrochemical industry grows, so will demand for instrumentation and other specialized equipment needed in these plants**

The Petrochemical Industry — It's something big, undoubtedly — but how big? Where is it going, and how fast? To try to answer these and other questions . . . to gain a keener insight into the nature of this remarkable, world-wide petrochemical development . . . and to try to clear up misunderstanding in this area, CHEMICAL PROCESSING recently conducted a research study on petrochemicals. A number of key petrochemical leaders were quizzed. Here is a summary of their views, which are highly enthusiastic. This will be followed by some of the more pertinent of the comments by individuals.

Petrochemical Definitions

First — what is a petrochemical? Most agree that, "A petrochemical is a material obtained mainly from petroleum or natural gas or their derivatives, and having further application in chemical processing." This, perhaps, seems elementary, but complications arise when some lump into this definition materials which aren't always made from a petroleum source. For example is acetylene a petrochemical? It is made from calcium carbide as well as from petroleum sources.

Then, too, there is the question of how far along in further processing a "petrochemical" can be before it ceases to be a petrochemical. Besides, some don't like the word "petrochemical" at all, prefer "petroleum chemicals" or other phraseology.

This subject of definitions has been a topic of considerable discussion and controversy and will not be pursued longer here since it could become quite lengthy. The subject of petrochemical definitions may be explored more fully in a later article. (The word is defined in some scientific dictionaries recently published.)

Petrochemical Industry

In spite of differences in terminology or definition, practically everyone recognizes the existence of such a field: chemicals having petroleum origin. In fact, about one-third of the leaders consider *the petrochemical industry* as a separate entity — an industry in itself. Remainder think of the petrochemical industry as a development of the chemical industry with petroleum overtones — or as a development of the petroleum industry with chemical overtones.

Pacesetters among petrochemicals will be plastics such as polyethylene, and synthetic rubber. Petrochemicals are mostly organic, contrasted to the simpler inorganic chemicals. Petrochemical plants require large capital investment — have a high degree of instrumentation, with high labor productivity. Petrochemicals are produced in large quantities. It is no "basement-type" operation.

Specialized Equipment Needed

About 90% of the petrochemical leaders considered that the petrochemical industry uses some degree of specialized equipment — in contrast with equipment identical or nearly identical to that required for chemical or petroleum processes. Although differences arose as to how extensive this requirement was, average figure for specialized equipment needed by a petrochemical plant was estimated to be 26%.

Petrochemical Investment

The survey indicates that about five billion dollars is invested in the petrochemical industry in the United States at present — and that this investment is growing at a rapid rate. Conservative estimates are that the capital invested in petrochemical plants in the USA will have increased by at least another billion dollars in the next two years and will be at least doubled in ten more years. At present there are about 400 petrochemical plants in the United States.

World-wide Development

General comments of the leaders confirmed the world-wide nature of the petrochemical development. It is estimated that about 80 to 85% of the petrochemical plants in the world are in the United States at present. However, although the petrochemical industry has been largely a development of the United States, other countries are making a bid to catch up. Production of petrochemicals is increasing at about 12% per year

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From preceding page

in the USA and about 25% a year in foreign countries.

West Germany is considered by majority of those surveyed to be the country that will run ahead of the pack in petrochemical developments — with Great Britain, the United States, and Italy not far behind. Canada, Japan, France, and Latin America have a rapidly developing petrochemical industry. Russia and other countries in the Eastern Zone have great resources for petrochemicals and are starting to develop them vigorously. Belgium, Holland, Mexico, Puerto Rico, and other countries are also in the petrochemical picture.

Bright Future

About 80% of the executives predict that the petrochemical industry will have a substantially faster rate of growth in the years ahead than either the petroleum or the chemical industry. Remainder were more moderate in their predictions, anticipating a growth about equal to or slightly faster than either the chemical or the petroleum industry.

The question of "What's ahead in petrochemical development?" can probably best be answered by some of the more pertinent of the individual statements of these leaders:

A. W. FLEER, General Manager — Technical; Mfg. Dept., Shell Chemical Corporation, and member of CHEMICAL PROCESSING Editorial Advisory Board — As a source of raw materials for organic chemicals, natural gas and petroleum will hold spotlight for next 50 years; after that, back to coal; thence to shale, then to wood; then to plant or sea carbonaceous materials.

Another petrochemical executive says many new and useful products will be developed by the petrochemical industry. This will involve the replacement of existing products with improved products and new products — which can best be described as figments of the imagination. The United States will continue to lead in petrochemical developments.

R. G. HEMMINGHAUS, Vice President, Chemstrand Corporation — Bright future should be in store for petrochemical developments. The growth rate should continue to bring about a doubling of capital investment every five years. Foreign expansions, barring international crisis, should be an added stimulus to the industry.

The petrochemical portion of the total chemical industry should go from about 25% in 1957 to close to 50% in 10 years.

Dr. ROBERT L. BATEMAN, Director of Marketing Services, Union Carbide Chemicals Company, Division of Union Carbide Corporation — The petrochemical industry will continue to grow for the next 15 years at close to its recent dynamic rate. Look for marked expansion in fibers; for chemical fuels and lubricants for jets and rockets.

Look for greater use of petrochemical products in construction of home and industrial buildings, and in agriculture to provide increased yield on fewer acres.

As to definition, a petrochemical is a chemical compound or element derived or synthesized in whole or in part from natural gas hydrocarbons or petroleum or petroleum hydrocarbons, and *intended for chemical markets.* It follows, therefore, that a petrochemical plant is the complex that produces the above *chemicals.*

The petrochemical industry is a wedding of the raw material synthesis and handling of gaseous liquid hydrocarbons "know-how" of the petroleum industry and the organic synthesis "know-how" of the chemical industry.

It is my opinion that Canada will run ahead of all other countries in petrochemical development — followed by Great Britain, Germany, and Italy in that order.

Dr. H. M. WALKER, Manager, Development Department, Monsanto Chemical Company, Texas City, Texas — I anticipate that the bulk of new expenditures in the petrochemical field during the next 15 years will be for major capacity increases for present petrochemical products. Rate of introduction of strictly new petrochemicals will be considerably less than during the last 15 years. All of the aromatics, including naphthalene, will become more petroleum-based. The petroleum industry will more extensively enter petrochemical manufacture. More attention will be given to the selection of optimum sources of raw materials. Bulk transportation of raw materials and products by pipeline, barge, and tanker will be greatly expanded. Much attention will be given to reducing capital cost, operating cost, raw material cost, and overhead items to preserve acceptable profitability levels.

USA has a very considerable lead in new petrochemical developments — which will be maintained. West Germany will probably be the second most important contributor.

Other countries will principally occupy themselves with application of US and German-developed technology to their own economies.

CARL H. POLLENGER, Assistant General Manager, Koppers Co., Inc. — I would think that petroleum as a source of chemical raw materials would increase in importance as chemical demand growth reaches available by-product coke oven capacity. Petroleum-based chemicals should have a remarkable future.

Report on petrochemical research study will be continued next month with further comments by petrochemical leaders.

DEWEY MARK,* Chemical Sales Manager, Cosden Petroleum Corporation — It is felt that within the next 5-10 years at least 50% by weight of the total US chemical output will be able to trace its origin to either petroleum or natural gas. It is expected that this will increase to an even higher level. This achievement can, perhaps, basically be attributed to a historical attitude of the petroleum industry, namely, almost free exchange of technical information and lenient cross-licensing procedures.

**Dewey Mark recently joined Vickers Petroleum Co. as Chemical Sales Manager.*

A representative of one large chemical company reports: Future development of petrochemicals will be spurred by a) growing availability of petrochemical raw materials to countries and companies who were previously in "have not" positions, and b) more wide-spread acceptance of an opinion that conversion of these raw materials to chemicals is more profitable than conversion to fuels. These forces will tend to cause a more rapid growth in petrochemicals than in other areas of chemical and petroleum development. Investment in petrochemical plants is about $5 billion in the USA, $250 million in Canada, and $750 million in the rest of the world.

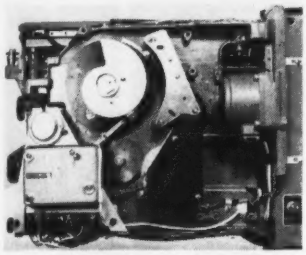
H. C. HAYWORTH, Development Director, Polymer Chemicals Div., W. R. Grace & Co. — As by definition, most of the plastics fall into the petrochemical field. Second, it is felt that plastics generally will continue to grow rapidly — with new materials coming to the forefront every year. This is one reason why the petrochemical development, consisting of new products and new processes, will one day outstrip both chemical and petroleum developments.

Area computer for gas analysis procedures mounts in recorder

Continuous integration of curves is possible

Uses: For area computation in gas analysis procedures, flow totalization, or temperature recorder averaging.

Features: Linear integrator mounts in recorder. It is designed specifically for strip-chart recorders and other low-force low-torque devises.



Area computer (lower left) mounts easily within recorder

Description: Integrator is a compact ball and disc integrating mechanism assembled with a counter and output pulse switch. It provides continuous integration of a curve as the curve is being described.

Instrument can be used wherever variable to be integrated or averaged is presented as a shaft position or displacement. Normally, computer is mounted in suitable position to accept output of transducer or recorder pen motion as an input. As measured variable changes, this motion positions ball carriage so counter speed is proportional to integral of variable with respect to time or time input function. Counter then reads results as computation.

Adaption kits for more popular strip-chart recorders are available. Instrument will accept output of sensing elements directly. Linearity is 0.1% of full scale. Output of counter can be in four digits.

(Model 25 Linear Integrator is product of Librascope Incorporated, 808 Western Avenue, Glendale 1, California.)

Check 3423 opposite last page.

PETROCHEMICALS

another broad field for UOP service to oil refiners . . .

In its business of developing improved refining processes for the oil industry, Universal Oil Products Company has long been vitally concerned with effective means of producing the valuable chemical products from petroleum. The great worth of these petrochemicals to our national economy is recognized by everyone. They are vitally important to the refining industry, too, if refiners are to maximize the value of products from crude oil processed through their plants.

In the interest of the oil refining industry UOP has recently established a program of petrochemical process and marketing development. Under this program any refiner, anywhere in the free world, regardless of the volume of his operation will be able to enjoy the economic and operating advantages which the production of the petrochemicals most suited to this operation can provide.

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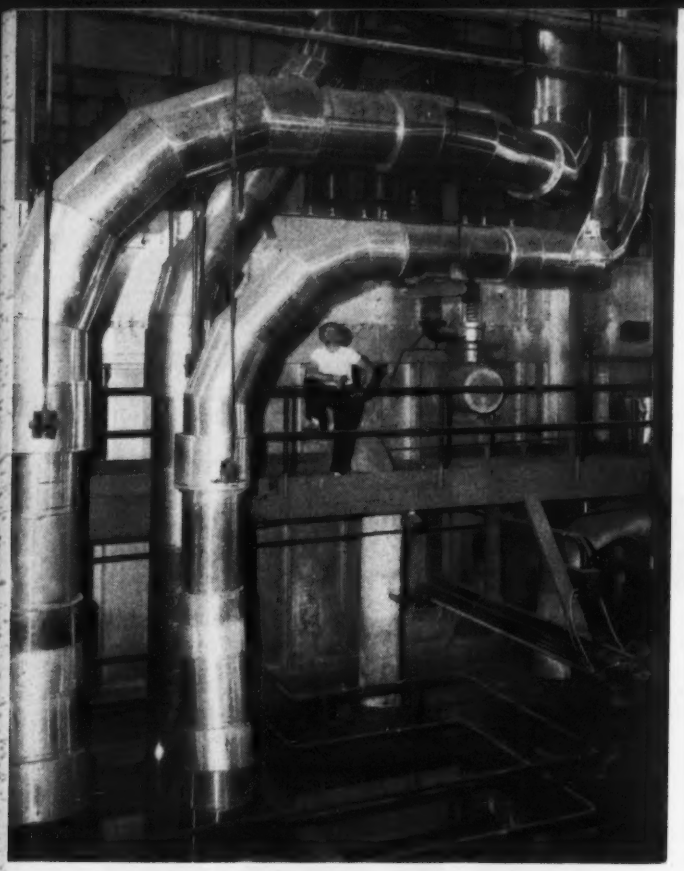
Check 3424 opposite last page.

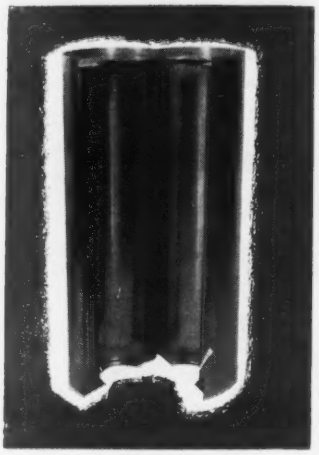


This vertical steam main, about 100' high and operating at temperatures up to 1050°F, utilizes aluminum reflective insulation

Aluminum reflective insulation saves installation time

Prefabricated material used in petrochemical plants is non-absorbent, hence safer — contains no chlorides, a possible cause of stress corrosion cracking of stainless — and since it stores little heat, is ideal for piping or vessels operating at cyclic temperatures

GORDON WEYERMULLER, Associate Editor
With **W. C. TURNER,** Staff Engineer
Union Carbide Chemicals Company
Div. of Union Carbide Corporation
South Charleston, West Virginia



Section of aluminum reflective insulation for pipe

Petrochemical plants, particularly a number of the polyethylene plants recently built, have been able to save installation time and money through the use of aluminum reflective insulation — as well as achieve a number of operating advantages. Since the insulation is prefabricated and is designed to fit piping and vessels, it can be installed rapidly and easily.

For example, on a recent polyethylene installation involving both piping and equipment, field cost to install aluminum reflective insulation was about 10% of the total installed cost of the product; and the time to install was only a fraction of that for conventional insulation. It is estimated that on this polyethylene unit, about two weeks of reduced erection time was gained through the use of the reflective insulation.

In cases where it is necessary to remove insulation periodically for servicing of equipment — such as vessel heads, valves, or other units — the easy removal and reinstallation feature of reflective insulation is important.

Recently, aluminum reflective insulation on a polyethylene system at one plant was removed because of major system changes. However, the insulation was not scrapped. Instead, it was shipped to a new plant to be reused on a system similar to that from which it was removed.

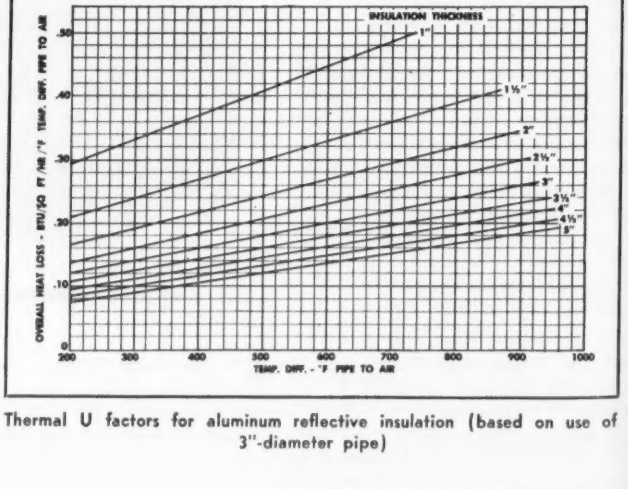
Non-absorbent Property Improves Safety

Earlier forms of reflective insulation contained refractory or blanket material. Aluminum reflective insulation discussed in this story, known as Mirror, contains no absorbent material whatsoever.

This non-absorbency is important where chemical leakage or spillage might saturate the insulation. Most insulation materials are highly absorbent. Insulation soaked with flammable chemicals can be a fire hazard since these chemicals can contribute to and spread an accidental fire. In addition, some chemicals and insulating materials react with each other to cause fires without any other source of ignition. For these reasons it is most important to use a non-absorbent insulation where chemical spillage or leakage may create a fire hazard.

Fact that reflective insulation contains no chlorides becomes important when it is necessary to insulate stainless steel equipment and piping. Most mass insulations contain chlorides. These chlorides may be leached from the insulation by moisture and deposited on the stainless steel surface.

It is suspected that these chlorides, on stainless steel operating from 50 to 250°F, con-



Thermal U factors for aluminum reflective insulation (based on use of 3"-diameter pipe)

tribute to stress corrosion cracking. Use of reflective insulation eliminates one factor contributing to this hazard.

Although the use of reflective surfaces to retard heat flow has long been known, this method has not been widely used — probably due to a lack of understanding of the principles involved.

Basically, aluminum reflective insulation utilizes the principle of the Thermos bottle — the use of parallel heat-reflective surfaces separated by the non-conducting spaces. Product might be described as the "thermos without a vacuum." It reflects heat just as a mirror reflects light. Insulation employs several spaced sheets of aluminum with a sturdy outer cover, arranged to provide air chambers between layers. It is rigidly supported in a manner which minimizes conduction. Reflective insulation varies in thickness 1 to 5".

Low U Factor

Aluminum reflective insulation constructed this way forms a very effective heat barrier with a low U factor — i.e., low overall unit heat loss. In fact, the U factor is lower than that of other conventional insulations. For example, U factor of 2" of aluminum reflective insulation over a 3" diameter pipe at 400°F temperature difference between pipe and air, is 0.22 Btu/sq ft/hr/°F. (See graph.) The U factor for one widely used conventional mass-type of insulation under the same conditions is 0.32 and for another widely used type it is 0.34.

Low heat capacity of reflective insulation can be very important where it is necessary to insulate vessels or piping operating at cyclic temperatures. Very little time is required to change the temperature of the insulation itself. Hence, little time is lost in bringing equipment to desired operating conditions. Different types of this reflective insulation can be obtained for temperatures ranging from -100 up to 1500°F.

To next page

"B&W Welded Stainless Steel Tubing resists corrosion because it is fully annealed and precision made

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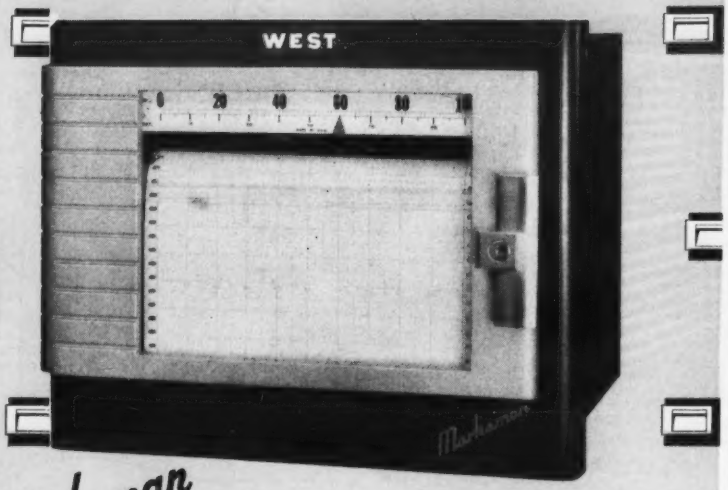

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Aluminum Insulation

From page 91

Another place where such reflective insulation can be used to advantage is on expansion joints or piping subjected to twisting. Reflective covering can be designed with overlapping slip joints so that motion of the pipe will not cause breaks in insulation surface.

Since the reflective insulation is constructed of corrosion-resistant aluminum, it is inherently weatherproof, impervious to thermal shock — and especially well-suited for outdoor plants. Insulating units can be stored outdoors unprotected during plant construction, and installed in any kind of weather. Lightness in weight and good appearance even after several years service are also favorable factors.

(For further information on aluminum, as used in reflective insulation, contact Kaiser Aluminum & Chemical Sales, 919 N. Michigan Ave., Chicago 11, Ill.)

Check 3427 opposite last page.

(Aluminum reflective insulation is manufactured by Mirror Insulation Co., 201 Main St., Lambertville, N. J.)

Check 3428 opposite last page.

Petroleum Chemicals completing interstate ethylene pipeline

Continuance of trend toward transportation of petrochemicals by pipeline is seen in pipeline now being completed for moving high-purity ethylene from the Lake Charles, Louisiana, plant of Petroleum Chemicals, Inc. to its customers in the Orange, Texas area.

Plant being built at Lake Charles by The Lummus Company is capable of producing 200 million pounds of ethylene per year by cracking gases from adjacent petroleum refineries. Production can readily be expanded to 300 million lb per year.

Pipeline is being con-

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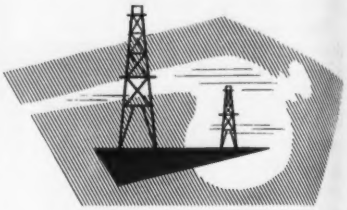

An outstanding development in British industry in the last twenty years has been the expansion of the Petroleum refining and Chemical Industries. The Chemical and Petroleum Engineering Exhibition—the first of its kind—will present dramatic evidence of the tremendous achievements that have been made.

At Stand after Stand, contractors, designers and specialists in every branch of British chemical and petroleum engineering will have something to show of vital interest.

The Exhibition will also include a conference on "The Organisation of Chemical Engineering Projects" arranged by The Institution of Chemical Engineers and The Institute of Petroleum; and films will show how the Chemical Plant and Petroleum Equipment Industries have helped in the development of their consumer industries.

A visit to this Exhibition is a MUST to all concerned in chemical and petroleum projects and to everyone whose industry is in any way influenced by such projects.

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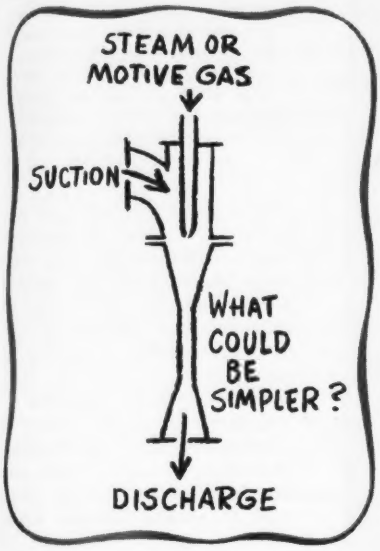

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structed of German-manufactured pipe of 6⅝" OD and has a length of 30 miles. Ethylene will be placed in pipeline at 1000 psi and delivered at the other end at 450 psi. When deliveries are small, pressure can be increased to 1000 psi the length of line, permitting its use as a storage facility.

Butadiene study

An extremely thorough presentation of the present and potential uses of butadiene is given in this 42-page spiral-bound monograph. Physical and chemical properties, polymerization and reaction data, and a bibliography of 286 entries are given. "Butadiene" — Petro-Tex Chemical Corp., PO Box 2584, Houston 1, Tex.

Check 3431 opposite last page.

Hot-gas expander turbines at petrochemical plant utilize waste gas

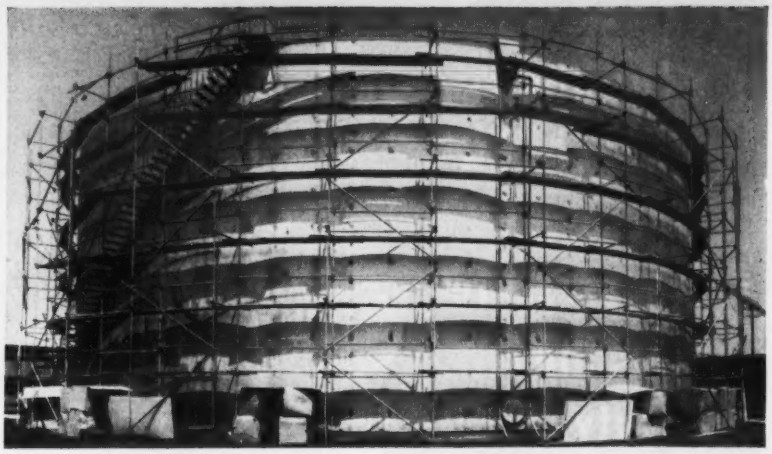
Supply 60-65% of power for compressor

Waste gases are being used to furnish 60-65% of the power required to drive compressors by utilizing two hot-gas expander turbines at Cooperative Farm Chemicals Association, Lawrence, Kansas. Plant is developing 3860 hp from waste gas that would have to be disposed of in some manner. If this power were not available from the expanders, plant would have to have additional capacity in steam boilers to develop the power.

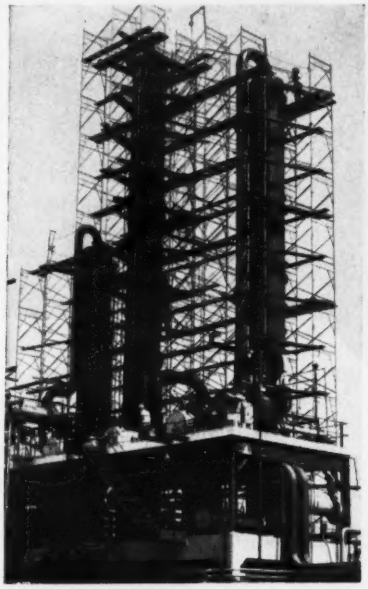
The two expander turbines are used in the manufacture of nitric acid. A centrifugal compressor delivers high-pressure air to the process, where the oxygen portion is consumed. Residue, or tail gas — mainly N_2 with small quantities of nitric oxides and H_2O — leaves the absorption tower at about 90-100°F. By heat exchange from the product gas, it is heated to 850°F before it enters the expanders.

Basic construction and op-

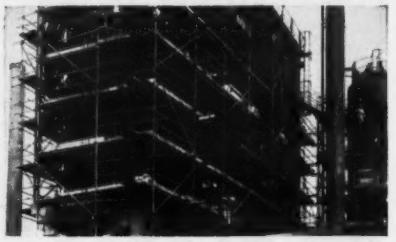
Scaffolding Methods...by Patent Scaffolding Co.



ODD SHAPES — "TubeLox"® Scaffolding gives workers quick access to the curved shapes of tanks of any design. Erected and dismantled rapidly from only four basic parts, the strong, slender components can be assembled to fit any size, shape, or contour and set up on any terrain. It can also be cantilevered to reach over circular units without touching them. No matter how complex the job, "TubeLox" Scaffolding can be easily assembled to provide safe, efficient working platforms.



PREFAB PLATFORMS—"Trouble Saver"® Sectional Steel Scaffolding is made of prefab frames, diagonal braces, bases and adjustable legs. Frames vary from 2' to 5' wide and from 3' to 6'6" high to provide proper heights and widths of working platforms to fit the job. Here, it gives maintenance crews easy, safe tower access.



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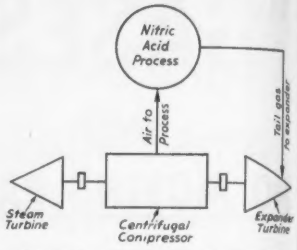
PETROCHEMICALS



Typical arrangement of expander in a chemical plant. Steam turbine provides power for starting and bringing compressor over surge point. As tail gas starts flowing from process, expander turbine gradually takes over 65% of compressor load

eration of a turbine gas expander is similar to that of a steam turbine. Expander converts thermal energy of hot gas into mechanical energy of rotation by expanding gas through nozzles and directing resulting high-velocity flow against expander buckets.

Quite often a compressor is provided with a double-shaft extension, coupled on one end to expander and the other end to steam turbine. Since no tail gas is available at startup, auxiliary driver must be capable of supplying sufficient power to bring compressor above its surge point. As tail gas starts flowing from process, expander gradually takes major portion of load.

The two expanders at Cooperative Farm Chemicals Association have been in practically continuous operation since 1954. Each one develops 1930 hp at 6850 rpm.

(Hot-gas expander turbines are product of Steam Turbine Div., Worthington Corporation, Wellsville, N. Y.)

Check 3434 opposite last page.

Covers petrochemicals

Variety of petrochemicals for the paint, plastics, rubber, chemical, petroleum, detergent, and other industries are described in 24-page brochure. Tables of typical properties are also included. "A New Resource" — Amoco Chemicals Corp., 910 S. Mich. Ave., Chicago 80, Ill.

Check 3435 opposite last page.

Petrochemical growth of 124% by 1965 predicted

Although petrochemical production is increasing by leaps and bounds in foreign countries and petrochemical plants are springing up all over the US, the Texas-Louisiana Gulf Coast is expected to maintain its position as world petrochemical center

At a recent joint meeting of the Chemical Market Research Association and the Commercial Chemical Development Association in Houston, Texas, it was estimated that petrochemical production will more than double in the United States by 1965. Wayne Kuhn, General Manager, Research and Technical Dept., The Texas Company, presented the following figures which indicate the tremendous growth of the petrochemical industry in the United States.

Petrochemical Growth in US

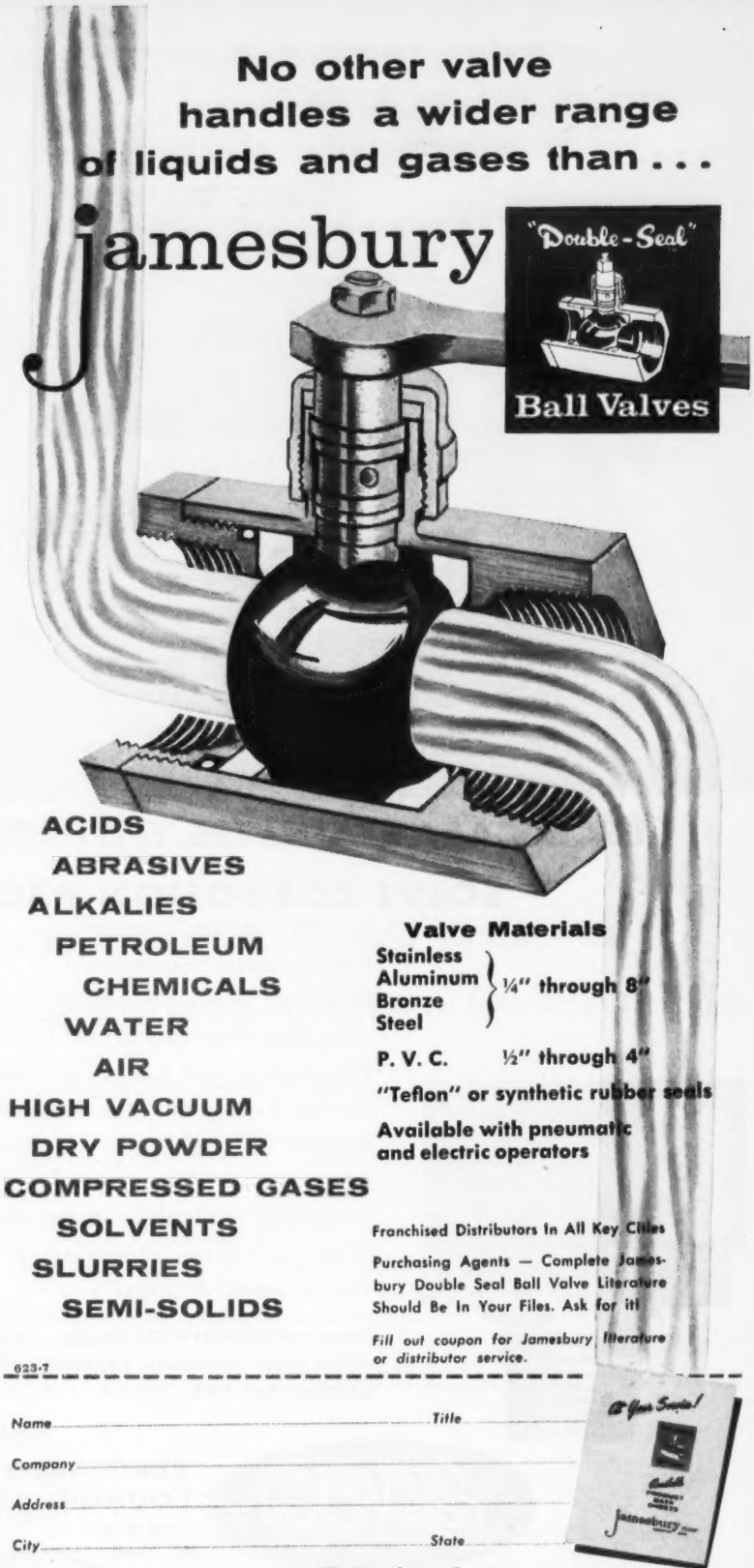
Year	Billion Lb/yr	% of Total Chemicals
1930	0.14	1
1955	32	24
1957 est	38	26
1962 est	62	31
1965 est	85	40

Mr. Kuhn said that in 1951 he estimated 62 billion pounds of petrochemicals would be produced in the US in 1962 and he sees no reason to revise this figure now. In fact, some believe this figure may be reached as early as 1960. The 85 billion pound petrochemical figure for 1965 represents 40% of the estimated production of all chemicals in the US for that year.

Wayne Kuhn of The Texas Company, who predicts a bright future for petrochemicals

The 124% growth rate for petrochemicals by 1965 predicted by Mr. Kuhn can be compared to the 50% increase in refined petroleum products by 1965 estimated by others at the meeting. At present 1.45% of the US crude is processed into petrochemicals. This figure is expected to increase to 2.30% by 1965. About 50% of petrochemical raw materials are byproducts from refinery operations and the rest come from natural gas and LPG.

The Louisiana-Texas Gulf Coast, which has about 35% of the domestic refining capacity, produces about 73% of the petrochemicals in the US according to speakers at the



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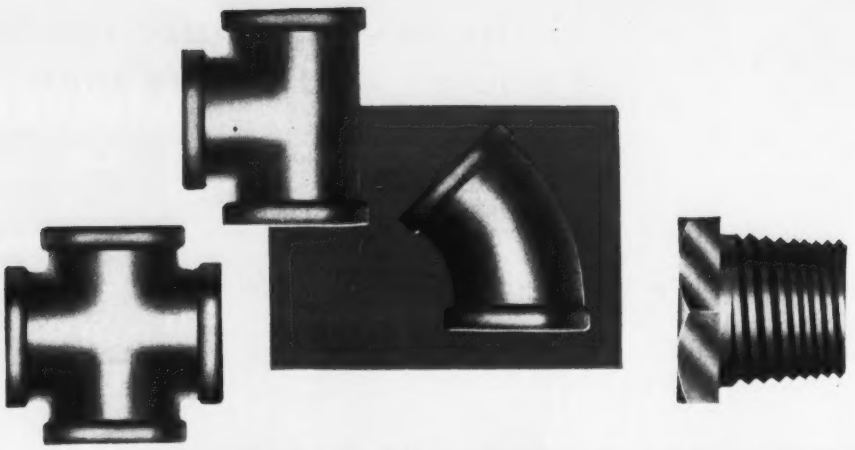

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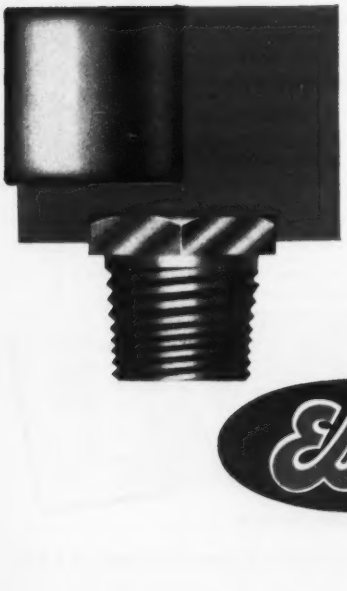

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meeting. Increased use of foreign crude will mean more refinery capacity on the East Coast, which is closer to the source of supply and near a huge marketing area. These new refineries will mean added sources for petrochemicals on the East Coast.

Foreign Petrochemical Industry

Export demand for petrochemicals is expected to decrease because of the rapidly growing petrochemical industry abroad. Canada is becoming more than self-sufficient in petrochemicals. Mexico is looking and planning in the petrochemical field. Japan has gone all-out in building petrochemical plants. India has a program with a goal set for 1961. Western Europe will increase petrochemical production about 70% by 1960.

Ethylene and Propylene

Kendall Greene, Director of Commercial Research, Petrochemical Dept., Gulf Oil Corporation, estimated that the US, which required 3.6 billion pounds of ethylene in 1956, will need 6.5 billion pounds in 1965. About 2.0 billion pounds of propylene will be required for petrochemicals in the US in 1965. Largest unknown in the propylene picture is the recent advent of polypropylene in the plastics fields. ■

Petrochemical tow placed in service

Nickel-lined compartments protect products

An integrated tow was recently placed in service to carry Shell petrochemicals from Houston to Chicago via Mississippi waterways system. Making up tow are four barges, three of which are nickel-lined, and tow boat. Nickel safeguards the purity of petrochemicals, such as glycerine and hexylene glycol, eliminating possible iron contamination.

Four barges have a total capacity of 60,000 bbl and are

capable of carrying 14 separate products during each trip. Round trip for tow is expected to take 22 days, which is high speed for this type of shipment.

The three nickel-lined barges have a total of nine compartments. All of the barges are of double-skinned construction, a hull within a

Tow designed solely for the shipment of petrochemicals glides past San Jacinto Monument just outside Houston, Texas on the way to Chicago, Illinois

hull. In addition, steel girders normally placed on the underside of the deck have been placed on top of the deck. This leaves all compartments free of internal obstructions to facilitate cleaning and thus insure product quality.

(Information on nickel available from The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.)
Check 3438 opposite last page.

(Barges were built by Dravo Corporation, Neville Island, Pittsburgh 22, Pa.)

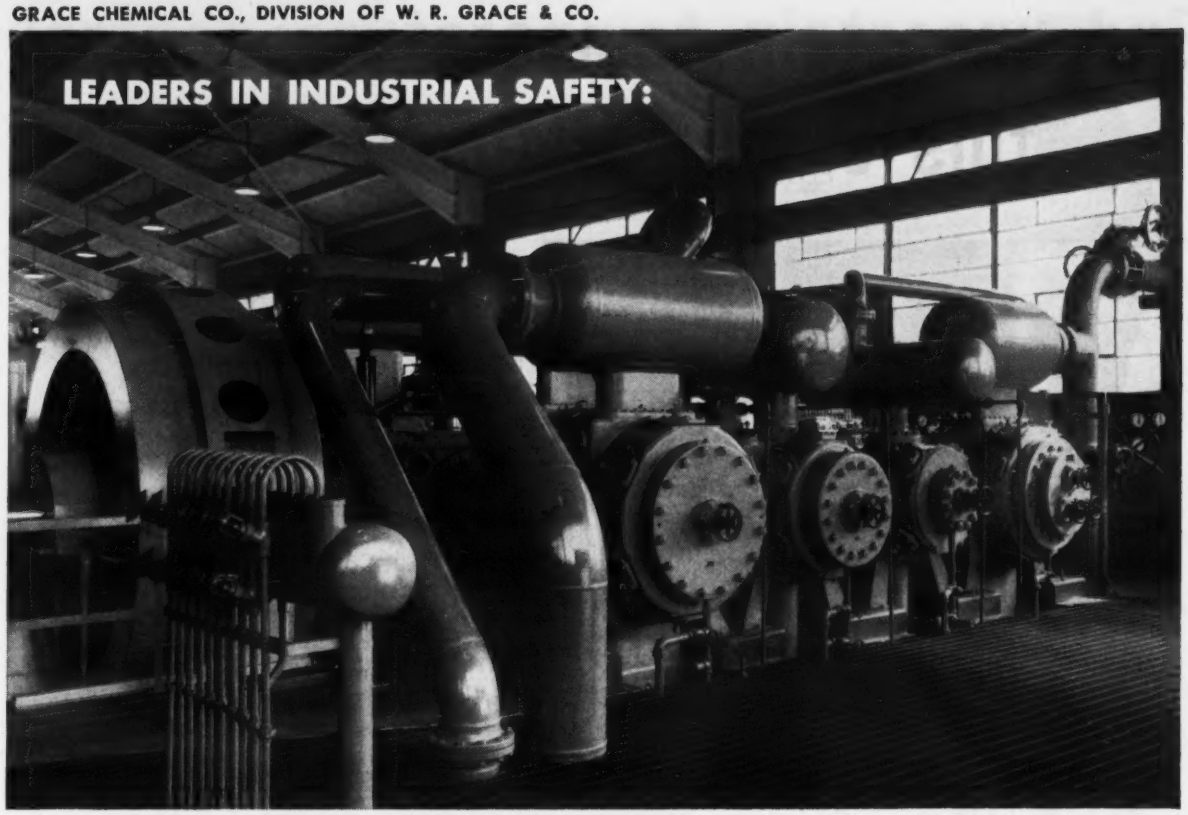
Check 3439 opposite last page.

Atmospheric coolers

Twenty-page catalog describes line of horizontal-core air-cooled heat exchangers. Units can be used for cooling and temperature control of oil, water, and gases as well as for condensing vapors. Petrochemical installations are illustrated and explained. Cat 557 — Young Radiator, Co., Racine, Wis.

Check 3440 opposite last page.

GRACE CHEMICAL CO., DIVISION OF W. R. GRACE & CO.



At its Memphis plant, Grace Chemical produces 300 tons of anhydrous ammonia per day. Three 4,000-h.p. compressors are the heart of this operation, each handling 3 different gases under varying intake and discharge conditions.

Fire-resistant PYDRAUL AC protects huge compressor operations at Grace Chemical Co.

Turning out 300 tons of anhydrous ammonia per day depends on reliable and SAFE performance of the compressors. That's why Grace engineers at Memphis take every precaution to insure continuous operation. They choose fire-resistant Pydraul AC to lubricate air compressors, minimize carbon deposits and thus reduce fire dangers.

Compressor fire and explosion dangers lurk in flammable lubricants and their residues deposited in compressed air cylinders and piping. Eliminate these dangers now in your compressors, any size, any make.

Conversion is easy . . . essentially, just drain your flammable fluid and replace with fire-resistant Pydraul AC.

Send the coupon for your copy of the new Pydraul AC booklet . . . for the answers to your compressor lubricant problems.

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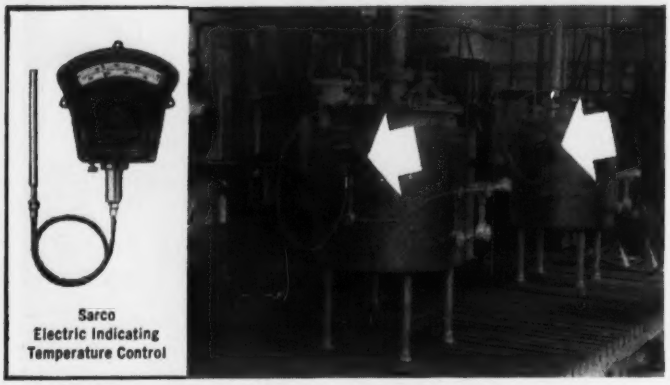
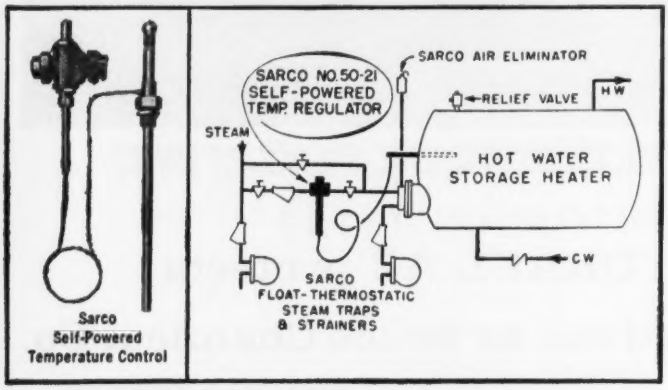
Check 3441 opposite last page.

End uncertain temperature control this simple low-cost way



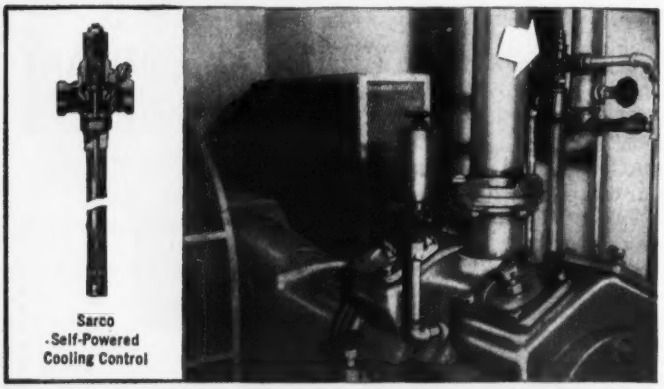
Sarco
Electric Indicating
Temperature Control

STILLS – jacket water temperature of stills held to within ± ½°F. *Other typical applications* – kettles, sterilizers, chemical tanks, plating tanks, processing vats, etc.



Sarco
Self-Powered
Temperature Control

HOT WATER STORAGE HEATER – desired water temperature is automatically maintained. *Other typical applications* – dryers, oil storage tanks, kilns, heat exchangers, etc.



Sarco
Self-Powered
Cooling Control

COMPRESSORS – controls temperature of cooling water, prevents overcooling and undercooling in compressors, aftercoolers and intercoolers. *Other typical applications* – small engines, condensers, ball mills, water-cooled bearings, lubricating oil coolers, etc.

SARCO Automatic Temperature Controls

Electric Indicating and Self-Powered

Simple—Dependable Inexpensive

YOU CAN get rid of costly, hit-or-miss manual temperature control . . . without investing in expensive equipment.

These Sarco Automatic Controls are simple, inexpensive, dependable. They're ideal for hundreds of temperature regulating jobs . . . all but the few specials that call for costly, elaborate controls.

Electric Indicating Controls by Sarco are simple, sensitive . . . perform many of the functions of much more elaborate recorder-controllers, at fraction of their cost. Responsive to temperature changes of ± ½°F. Cost . . . only about $100.

Sarco Self-Powered Controls need no outside power source. Self-contained. Packless. ½" size temperature controller . . . only about $100. ¾" size cooling control...only about $39.

Users of Sarco Controls include Colgate-Palmolive, Sinclair Refining, Swift, Ingersoll-Rand and hundreds of others.

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No. 620 — Self-powered Temperature Controls
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2234-B

SARCO

Automatic Temperature Control

ELECTRIC INDICATING AND SELF-POWERED TEMPERATURE CONTROLLERS • STEAM TRAPS • STRAINERS

Check 3442 opposite last page.

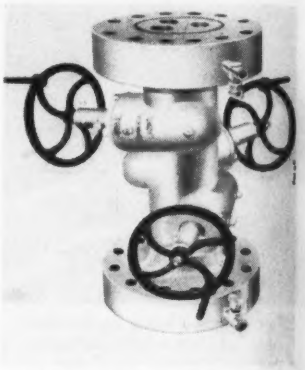
Three 2-inch gate valves in single body

API working pressures up to 5000 psi

Uses: For triple-completion Christmas trees.

Features: Unit has three 2-inch through-conduit gate valves in single body.

Description: Triple valve is available in six models with



"Triple-threat" unit has 2-inch through-conduit gate valves

API working pressures of 2000, 3000, and 5000 psi, and 8- and 10-inch flanges. Valve has pressure-seal bonnets, two roller-thrust bearings, parallel expanding gates, closed packing boxes, and superfinished stems.

(Triple valve is product of W-K-M, Div. of ACF Industries, Inc., PO Box 2117, Houston 1, Texas.)

Check 3443 opposite last page.

Drying gases

Six-page bulletin describes equipment designed for effective and economical removal of moisture from most gases. Units operate continuously. Pressures can range up to 3500 psig. Typical gases handled include carbon dioxide, carbon monoxide, hydrocarbons, nitrogen, oxygen, natural gas, hydrogen, propane, butane, and others. Bul SC-1013 — Selas Corp. of America, Dresher, Pa.

Check 3444 opposite last page.

. . . a critical place to safeguard your reputation with "**TUBE-TURN**" products

Stainless steel piping is a specialist. It fights corrosion . . . prevents product contamination . . . performs under great temperature extremes . . . is able to handle dangerous materials safely. Construction and maintenance dollars, often the safety of life and property, and *your reputation* are at stake in the selection of these materials.

When you specify TUBE-TURN* Stainless Steel Fittings and Flanges, you get extra-value features and greater strength at no extra cost. Fittings are marked with *complete* identification. Production procedures and quality control assure conformity to all code requirements.

Your nearby Tube Turns' Distributor can meet *all* your needs in welding fittings and flanges *promptly*.

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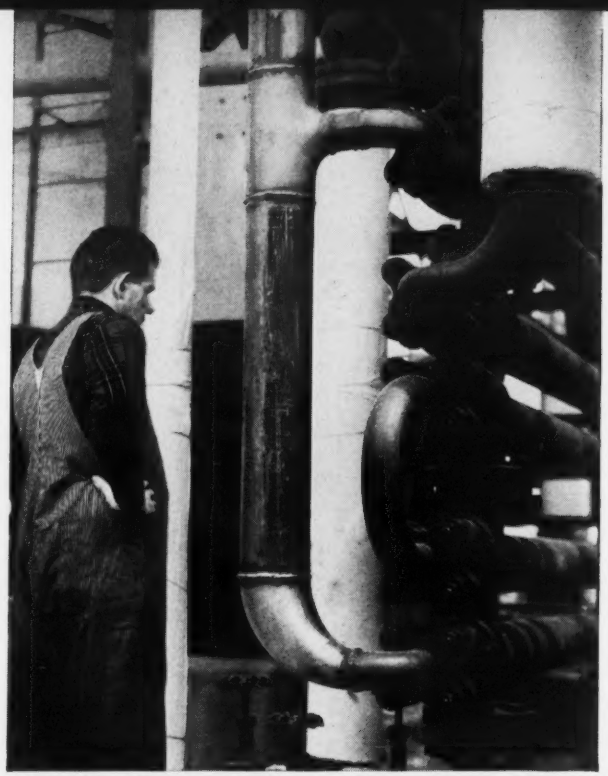
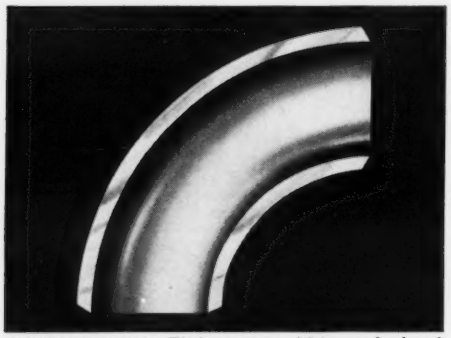
Stainless Steel Fittings

- Fittings meet *all* standard chemistry specifications
- Minimum wall thickness of elbows are at least 87½% of nominal
- All fittings meet calculated bursting pressure of matching pipe
- Qualified welders and procedures used where welding is required
- Each fitting properly solution heat-treated
- Each fitting passivated
- Special grades of stainless steel, and all other alloys available

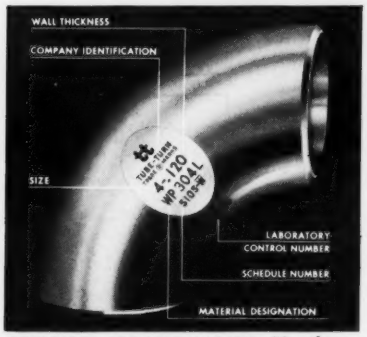
Meet all codes: ASTM A403 (for material and manufacturing procedure); MSS SP43 and ASA B16.9 (for dimensions); and MSS SP25 (marking procedure).



TUBE-TURN Stainless Steel Elbows and Tee in a petrochemical plant.

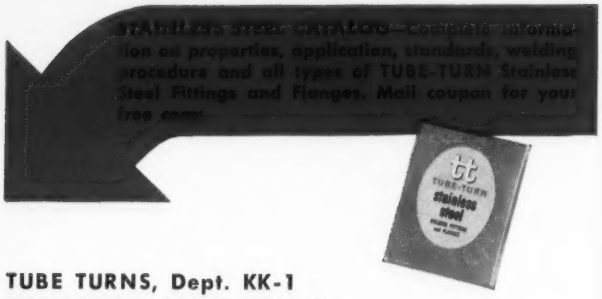


UNIFORM WALL. Fittings meet ASA standards of 87½% of nominal thickness . . . particularly important for light wall elbows. Many conventional stainless steel elbows are as much as 30% to 40% below nominal at this point of greatest wear. All TUBE-TURN* Stainless Steel Fittings, including tees, match calculated bursting strength of the pipe.



COMPLETE IDENTIFICATION. You *know* this fitting conforms to specified quality because the material type and quality control are fully identified. Manufacturer, size, wall thickness and schedule are also marked as shown on the fitting.

CUTS PURCHASING COSTS. You can order TUBE-TURN Stainless Steel Fittings from your nearby Tube Turns' Distributor . . . on the same order as other types of welding fittings in Tube Turns' line of 12,000 products. Cuts red tape. Saves time. Photo courtesy McJunkin Corporation, Charleston, W. Va.


STAINLESS STEEL CATALOG—complete information on properties, application, standards, welding procedure and all types of TUBE-TURN Stainless Steel Fittings and Flanges. Mail coupon for your free copy.
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Raising Living Scale

From page 40

3. Better equipment and machines. These have multiplied man's puny strength and made it really effective.

The Role of Capital

But power plants, factories, and machines do not come into being automatically. They must be paid for. This requires capital, **so the basic factor making possible the great rise in the real wages of American workers has been an increasing supply of invested capital.** The marked tendency for capital investment per worker and productivity per worker in the manufacturing industry to move together is shown by Chart 4.

The reason why the black curve in Chart 4 — the one showing capital investment per worker — has in recent years risen more slowly than has the red curve is that the older equipment owned by corporations is valued on their books at its cost in days when the price level was far lower than at present. Today, to build and equip a new factory may cost $15,000 or more per worker in the force to which the modern plant will give employment.

Without Saving, No Capital

Since, during the past century, growth in the volume of capital per wage earner has been the main factor responsible for multiplying by six the **real** average hourly earnings of factory workers, the question of what makes capital investment grow is one which is of major importance to the workingman.

Today many writers on economics, and even some economists, believe that capital, like Topsy, "just grows." In fact, they go so far as to condemn "over saving." The truth is, of course, that there can be no capital accumulation without saving, and that, for the great majority of people, saving is confined mainly to paying for

For more information on product at left, specify 3445 . . . see information request blank opposite last page.

—today's most-talked-about pipe insulation!

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Yes, UNIBESTOS is better than ever—it's stronger, lasts longer, saves insulation maintenance costs.

What has made UNIBESTOS® the No. 1 pipe insulation? Almost anyone can tell you today! (1) It's so easy to apply; (2) withstands impact, vibration, moisture, fumes; (3) seals itself at joints, needs no caulking; (4) a single layer locks-in more heat than other double-layer insulations; (5) can be removed and re-used, repeatedly, without damage or loss of efficiency. No wonder you'll find this superior protection saving money on large jobs and small.

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FREE! . . . from Unarco to Insulation Users

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If selecting pipe insulation is something you do often, you'll save time and avoid errors with this handy, new UNARCO Slide Rule. You should always have one nearby.

AID FOR THE ESTIMATOR
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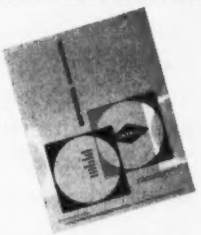
40 fact-packed pages explain how UNIBESTOS is made, what it is, what it does, why it's better —installation pictures, recommended thicknesses, and size range to 44" o.d.



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Check 3446 opposite last page.

TAYLOR-WHARTON GAS TRANSPORTS

By using Taylor-Wharton Gas Transports gas storage becomes flexible. This provides substantial savings and greater mobility of operations. Oil refining, petrochemical, food processing and electronic companies can make good use of these Taylor-Wharton transports to cut costs and expedite interplant haulage. Each tube meets I. C. C. 3A2400 specifications and is completely heat treated. Standard Transports have capacities ranging between 38,500 cu. ft. to 56,250 cu. ft. Each transport consists of a group of 2400 p.s.i. seamless steel storage pressure tubes rigidly mounted to a single or double axle model trailer.

More than a Century in Harrisburg 24, Pa.

HARRISBURG STEEL CO.

Division of HARSCO CORPORATION

Check 3447 opposite last page.

Raising Living Scale

From preceding page

such things as homes, home furnishings, and automobiles. The capital needed to finance industrial expansion must be in the form of cash or the equivalent. The results of a study made in 1952 by the Federal Reserve Board show that while in 1951 those having disposable incomes of $2000 to $5000 had 54% of the after-tax income, they had accumulated but 35% of the liquid assets. By contrast, 51% of such assets were possessed by those with disposable incomes above $5000, though they received only 37% of the total of such income.

Furthermore, a statistical analysis of data covering the years 1919 to 1939, inclusive, shows that during those years the total value of new corporate securities floated in the United States was governed mainly by the total of the after-tax income of persons in the "over $5000" income range. After that group as a whole spent $3 billion for living costs, they invested about 74% of their remaining disposable income in corporate securities.

Since 1939, the price level has doubled. Recent income statistics indicate that in 1951-2, individuals having incomes of $10,000 or over used a total of some $10 billion to cover personal expenses and then utilized 74% of their remaining after-tax income to promote the expansion of corporate activity.

As brought out earlier, the force primarily responsible for the rapid and prolonged advance in the real earning power of labor has been capital investment in equipment and machinery, and the bulk of this capital has come from two sources:

1. Corporate savings.
2. The savings of prosperous individuals.

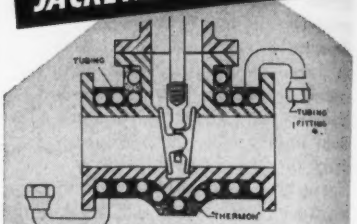
In 1953, corporate savings constituted a mere 4.6% of the distributable income of corporations. Chart 3 reveals the fact that Uncle Sam absorbs a large fraction of incomes in the $20,000 and over brackets. Since these are the two sources of the capital which has enabled American labor to forge ahead, the

Thermon

The Revolutionary New Solid

HEAT TRANSFER MEDIUM

SAVINGS UP TO 75% over JACKETED EQUIPMENT



Typical Thermonized Valve Section

Thermon, the product, and Thermonizing, the process, represent a revolutionary new concept in the science of external heat application. Thermon is a non-metallic plastic compound with highly efficient heat transfer properties, and is easily applied in a viscous paste form over either steam traced or thermal electric systems. It completely surrounds the tracer tubing and conducts heat to the entire surface to be heated.

Definite Advantages of Thermonizing are:

1. LOW COST—save up to 75% over equal jacketed equipment.
2. EXCELLENT HEAT TRANSFER—Exceeds steam traced equipment approximately 1100% and very closely approaches jacketed equipment.
3. DEPENDABILITY—no hot or cold spots.
4. WIDE TEMPERATURE RANGE—used for sub-zero cooling or heating to 750°F.
5. NO JACKET PLUGGAGES OR PRODUCT CONTAMINATION—in case of equipment failure, Thermon separates product from heating medium.
6. GOOD MECHANICAL AND THERMAL SHOCK RESISTANCE—cracking, spalling, and degradation are all nil—less than 1% linear shrinkage.
7. ADAPTABLE—may be used with either steam traced or thermal electric equipment—installed at our shops or your job location.
8. RAPID DELIVERY—use of standard equipment permits minimum delivery time.

Write for comprehensive brochure about revolutionary Thermon!

THERMON MFG. CO.

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Houston, Texas

Check 3448 opposite last page.

workingman who knows on which side his bread is buttered **will favor a system in which the winner in the competitive game is not despoiled of his honest gains, and will oppose vigorously all movements designed to cut down corporate profits and savings and to "soak the rich" with higher taxes** . . . for he will realize that the one way to assure a continuing rise in his scale of living is **to encourage and safeguard profit making and capital accumulation and investment.**

(Copies of the study, "Raising the Workingman's Scale of Living," may be obtained from The Constitution and Free Enterprise Foundation, Inc., 210 East 43rd St., New York 17, N. Y.)

Choosing Plant Site

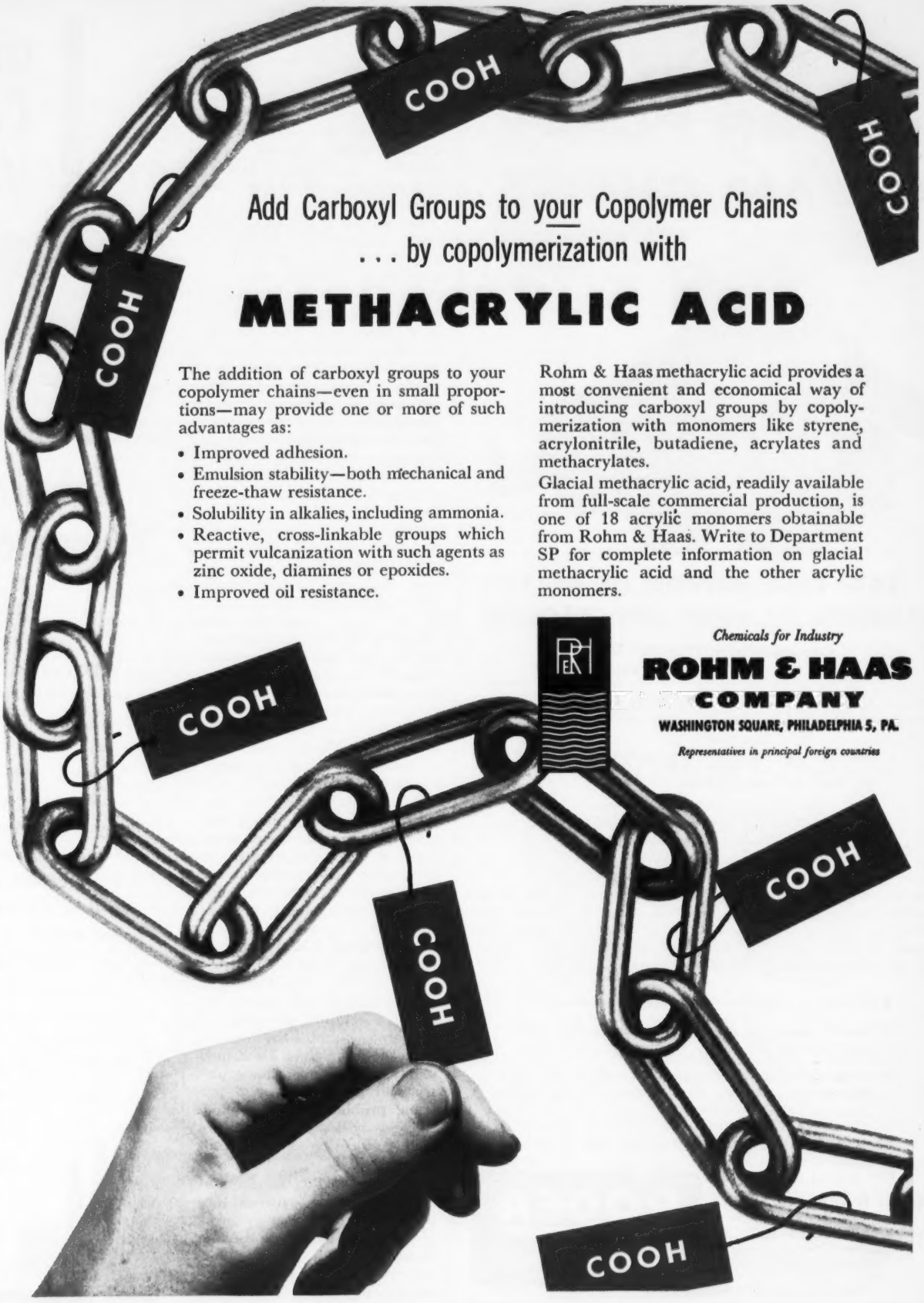
From page 28

they must also be shown that there are benefits from it, too. This is perhaps more important to the chemical industry than most others. Communities — at least those who aren't familiar with the industry — may think of a chemical plant as "smelly," or as a potential fire or explosion hazard. They may expect serious air or stream pollution.

Probably the best way to approach this problem is through the local newspaper, although other steps are necessary. In smaller towns particularly, the newspaper wields tremendous influence and we feel that the editor is among our best friends in a new community. He is also able to direct us to the best sources of information and help us gain a more complete picture of the town.

Meetings with the chambers of commerce and other community leaders are valuable; city officials are a must. Except in some rather exclusive suburban towns, they're generally eager to have new industry, and can make the selling job much easier for the new company.

Our experiences at Henry, Illinois, illustrate the point. From the beginning the local newspaper gave us its fullest support — and later won a 1st place award from the Illi-



Add Carboxyl Groups to your Copolymer Chains
. . . by copolymerization with

METHACRYLIC ACID

The addition of carboxyl groups to your copolymer chains—even in small proportions—may provide one or more of such advantages as:

- Improved adhesion.
- Emulsion stability—both mechanical and freeze-thaw resistance.
- Solubility in alkalies, including ammonia.
- Reactive, cross-linkable groups which permit vulcanization with such agents as zinc oxide, diamines or epoxides.
- Improved oil resistance.

Rohm & Haas methacrylic acid provides a most convenient and economical way of introducing carboxyl groups by copolymerization with monomers like styrene, acrylonitrile, butadiene, acrylates and methacrylates.

Glacial methacrylic acid, readily available from full-scale commercial production, is one of 18 acrylic monomers obtainable from Rohm & Haas. Write to Department SP for complete information on glacial methacrylic acid and the other acrylic monomers.

Chemicals for Industry

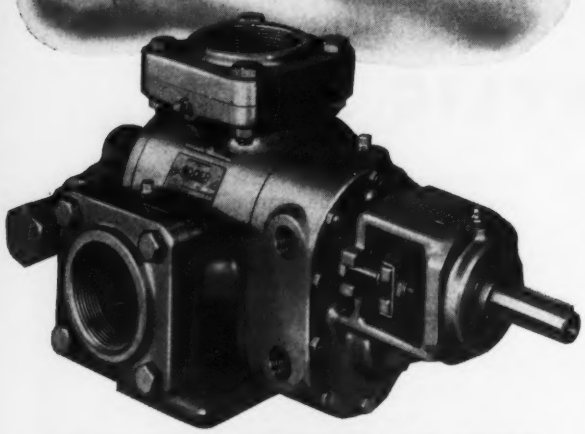
ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

Check 3449 opposite last page.

NEW ROPER PUMP WITH STEAM CHEST



LOW COST METHOD OF HEAT TRANSFER TO PUMP AND PACKING

Capacities from 27 to 223 GPM
Pressures Up to 100 PSI

This is the same Roper Series 3600 Pump as found in general transfer installations, but with the added feature of a steam chest. A rotary gear unit, it is available with or without relief valve . . . also furnished with gear reduction, if desired.

TWO TYPES OF CONSTRUCTION:

Spec. 3878 Fitted with Bronze Bearings
Spec. 4049 All Iron Construction
All Units Fitted with Aluminum Gaskets and High Temperature Packing

Steam Chest: Located between case and outboard bearing to transfer heat to both pump and packing. A low cost method for handling thick, viscous liquids. Can be used with steam, hot water, or heat transfer oil. Pump and steam chest static tested at 300 PSI. Recommended pressure with steam is 125 PSI.

- **Four ports in steam chest for installation convenience.**
- **Hardened gears and shaft precision ground; steel shaft induction hardened.**
- **Equipped with high temperature packing (600° F. max.) for effective sealing and long life. Pump fitted with aluminum gaskets.**

Send for Bulletin No. 29

Roper Hydraulics, Inc.
formerly
Geo. D. Roper Corp., Pump Division
742 Blackhawk Park Avenue
Rockford, Illinois

ROPER Rotary Pumps

Check 3450 opposite last page.

Choosing Plant Site

From preceding page

nois Press Association for its coverage of the story. We found that we had the complete suport of the local government and of the community as a whole. At one time, however, we began to think that perhaps we had oversold ourselves.

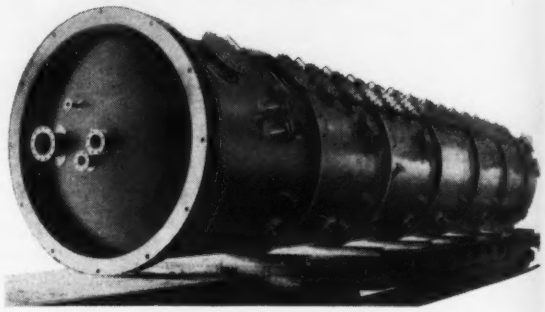
The Henry plant was originally planned to have 80 employees and was to cost around $5 million. Yet we began to feel that the townspeople might be expecting a little more in the way of income, additional taxes, and such than the new operation would actually provide. We felt that the people of Henry should have an accurate picture of what new industry means to a town.

This was achieved by flying a group of citizens to the Calvert City, Ky., chemical complex. While not precisely the same situation as Henry, it could give them an idea of how the new plant would affect their city. They were shown what measures are taken for plant safety and air and steam pollution control. They had a chance to talk to some of the people from Calvert City. There was an opportunity for them to find out what a new plant could mean in terms of taxes and community services.

The result of the tour was this: The people of Henry had a pretty clear picture of what happens when industry moves to a city. They knew what they could expect and what they couldn't expect. It's resulted in a clear understanding between Goodrich and Henry and has eliminated some of the problems that might come up. Of course, we couldn't possibly cover all of the areas within the limitations of this article. Each new plant, each area of the country will present its own peculiar problems. But the same concept will apply: a thorough, objective look at all factors.

Expensive? Yes, in terms of executive time, travel expenses and such. But in terms of the long-run good of the company it's a rather minor expense and is perhaps the best-spent money to go into a new plant. ■

another Custom-Built Vessel



fabricated by The Youngstown Steel Tank Company

This is one of two styrene stripping towers we have recently completed for The Goodyear Tire & Rubber Company. Both towers will be installed in Goodyear's Akron synthetic rubber latex plant.

The towers are 9'0" in diameter by 55'1" high, operating at 30 lbs. pressure and at full vacuum. All welding is ASME code approved and X-ray examined.

These styrene stripping towers are only one example of nearly 1,000 different products that will be custom fabricated by The Youngstown Steel Tank Company this year.

Write us today about the steel plate products you are buying. Our sales, engineering, and production departments will welcome the opportunity to serve you.

The YOUNGSTOWN STEEL TANK COMPANY
Youngstown, Ohio

Check 3451 opposite last page.

Emulsion made of non-thermoplastic alkyd resin permits paint manufacturer to —

obtain best properties in water-thinned paints

Uses: For manufacture of water-thinned interior paints that combine the advantages of solvent-type alkyd flat enamels. Non-yellowing white paints, and a full range of colors can be made.

Features: Paints made with this alkyd resin emulsion offer the advantages of latex paints: easy to apply, freedom from organic solvents and their odors, easy to clean up painting equipment and any spills, and can be thinned with ordinary tap water.

In addition, they offer the advantages of solvent-soluble alkyd flat paints: high hiding power, excellent scrub-resistance, and control of sheen down to a dead flat finish. Paints do not "skin" in the can. Paints dry with wet edge, can be recoated within one hour without lifting or crumbing.

Description: Called Cyaqua 405-20, this alkyd resin emulsion is produced without the aid of emulsifiers. On drying, the solids are converted by air oxidation to an insoluble film, which has all the desirable features of alkyd flat finishes.

However, Cyaqua emulsion does not set to an irreversible gel until it has oxidized. It does not therefore cause any problems during manufacture if at any stage water is evaporated. Neither will it skin in the container or clog processing equipment. It contains no casein or other protein which might putrefy on aging.

This alkyd resin emulsion disperses pigments readily, and tolerates high pigment loading. In general, p.v.c. (Pigment volume concentration) ranges between 50 and 55%, which gives one-coat hiding power. Coherent films can be obtained, nevertheless, at as high as 80% p.v.c.

As could be expected, manufacture of paints is relatively simple.

Since the resin used in this emulsion is not a thermoplastic polymer, its paints are free from many of the adverse features of latex paints. Film-forming properties are not dependent on room temp. Paints wet and adhere well to undercoats, sealers, or glossy enamels. Fresh paint spills may be removed with plain water. After one to two days, mineral spirits must be used.

Finished paints brush out easily, show negligible foaming. One week after application, film will withstand several thousand scrubs. pH of the emulsion is high, and water-soluble content of the dry film is low. Therefore corrosive tendencies are minimized.

Formula in Table I gives a good paint with dead flat sheen. Sheen is governed by pigmentation.

(Cyaqua alkyd emulsion is a product of Plastics and Resins Div., American Cyanamid Co., 30 Rockefeller Plaza, New York 20, New York.)

Check 3452 opposite last page.

TABLE I

typical formulation for interior flat white paint

	lb	gal
TiO_2 pigment	260.5	7.63
Fine particle natural wollastonite	172.2	7.12
Diatomaceous silica	50.8	2.65
Cyaqua emulsion 405-20	264.8	30.15
Ammonia, 28% (2% soln)	96.8	11.66
Cobalt naphthenate (6%)	1.1	0.13
White pine oil	4.7	0.60
Water (add some after grinding)	230.6	27.71
CMC (5%) (add after grinding)	104.5	12.35
	1186.0	100.00

Formulation: Grind above ingredients together in roller, pebble, high-speed stone, or colloid mill. Add CMC and portion of water to paste to adjust consistency. Adjust pH to 9.0-9.2 with additional ammonia, if necessary.

Characteristics

Non-volatile (%)	52.4
Viscosity (Krebs units)	64
P.v.c.	55.3
Co/resin solids (%)	0.05
pH	9.1

TABLE II

characteristics of cyaqua 405-20 alkyd resin emulsion

Total solids (% by wt.)	46-48
pH	8-9
Lb/gal (approx.)	8.8
Lb/gal (solids)	9.4
Particle size, average (microns)	1
Appearance	Creamy

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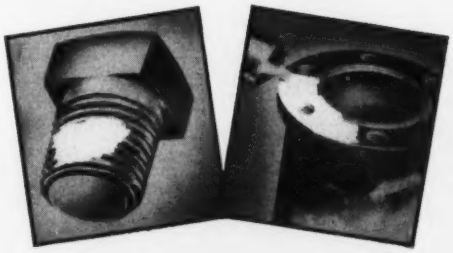
Check 3453 opposite last page.

The answer to those difficult LEAKING-JOINT Problems



The tough, clinging film of Leak Lock stretches rather than breaks

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During the past eight years Leak Lock has found its place in the chemical, petroleum, atomic energy, electronic, refrigeration and many other fields in constantly increasing uses for special purposes and as the answer to many "unsolvable" joint problems.

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Leak Lock

Check 3454 opposite last page.

HOW HERCULES HELPS...

DO-IT-YOURSELF FANS—New Red Stave* cellulose wallpaper paste based on Hercules® CMC makes home decorating easy. Red Stave cellulose paste is fast mixing and slow setting, will not stain or sour and is mold and vermin-proof. This new paste provides the same high quality and performance that has made Huron Red Stave wheat paste the professional paperhanger's choice for over 25 years.

*Hercules trademark

BEAT THE WEATHER—Rubber and plastic rain gear today protects you from head to toe against winter storms. Hercules is a basic supplier of essential materials used in their manufacture. Dresinate® emulsifier, Di-cup® curing agent, hydroperoxide catalysts, defoamers, and solvents serve the rubber industry while Hercoflex® plasticizers are important processing aids in the production of vinyl products.

HERCULES POWDER COMPANY
INCORPORATED
900 Market Street, Wilmington 99, Delaware

G58-1

CHEMICAL MATERIALS FOR INDUSTRY

HERCULES

Check 3455 opposite last page.

Phenolic molding mix is dimension-stable, resists 400°F temp

Uses: For glossy-finish appliance parts.

Features: Material offers excellent dimensional stability and can withstand temperatures up to 400°F.

Description: General-purpose black molding material is in powder form. It is a wood-flour-filled phenolic compound. Suitable for use in either cold-powder or preheated pill molding, compound offers compression molders low shrinkage and minimum thermal expansion.

(GE-12929 is available from Chemical & Metallurgical Div., General Electric Co., 1 Plastics Ave., Pittsfield, Mass.)

Check 3456 opposite last page.

Structural formula for antioxidant revised

On page 81 of December 1957 CHEMICAL PROCESSING is a description of Catalin Corporation of America's new Antioxidant AC-6 for polyethylenes, hydrocarbons, rubber, and waxes. Although the chemical description was correct — 2,2′-thiobis (4-methyl-6-*tert*-butyl) phenol — the structural formula was incorrect.

Instead of a central $-CH_2-$ group as shown, the molecule contains an -S- group.

Catalin advises that the name of this product has been changed to Antioxidant #6 instead of AC-6.

FOR PETROCHEMICAL ENGINEERS

Regular section on petrochemicals starting in this issue (page 87) contains editorials designed especially to meet the needs of petrochemical engineers in the more than 400 petrochemical plants already on stream in the United States.

THAT'S INTERESTING

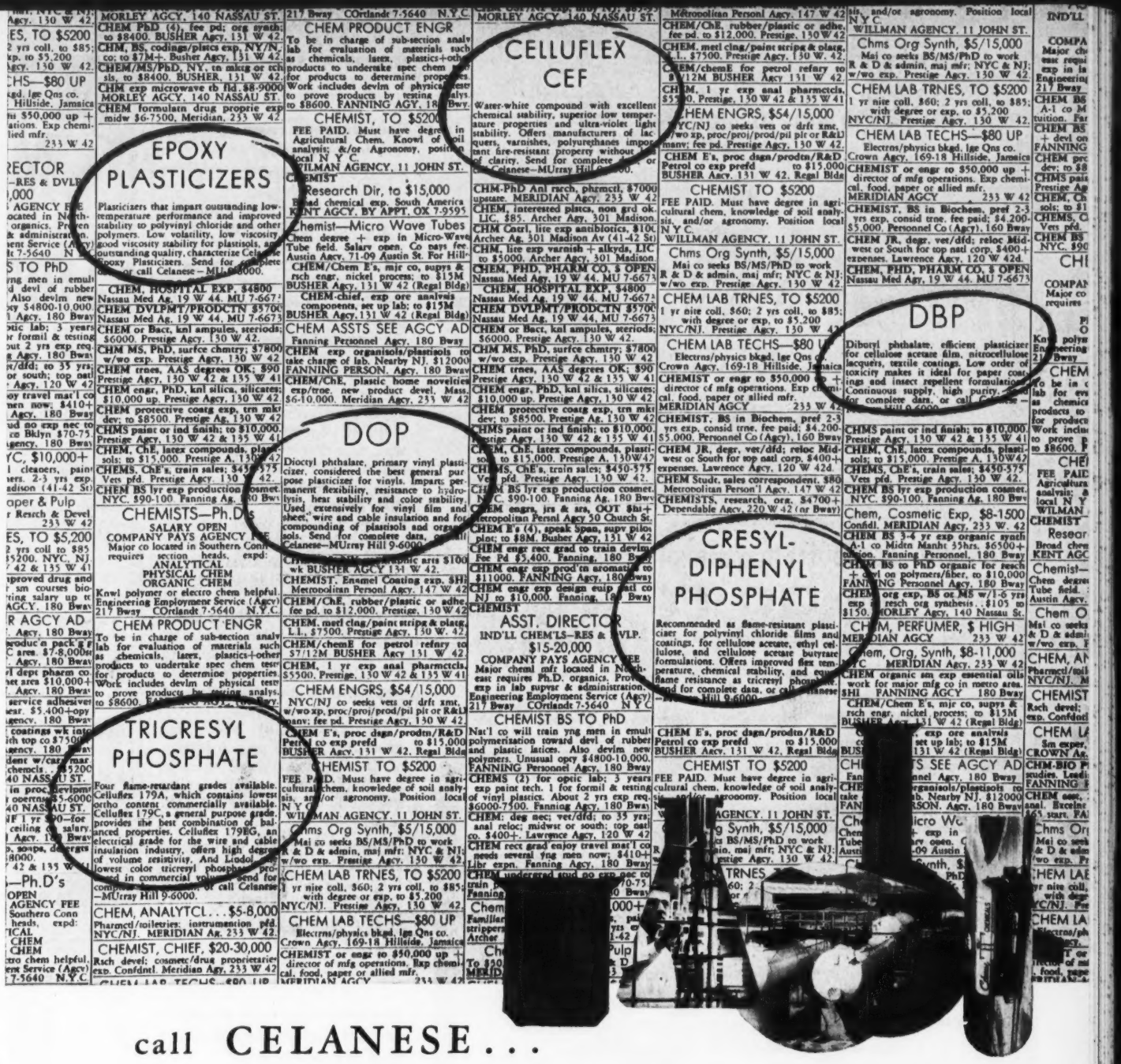
Research In Europe

Vertragsforschung is getting a foothold in free Europe. This German word for contract research done by independent labs or institutes is becoming more and more familiar as this type of research increases in popularity. Although it was practically unknown prior to World War II, it has become very successful since then. In fact, "research seems to be stimulated by competition." It is hoped that contract research institutes will tend to have an educational as well as research function.

Sub for Paint

Vinyl film soon may be playing a new role. If current experiments being run by an Ohio firm prove successful, a self-adhesive film of vinyl on a house may be a permanent replacement for present house paint.

For more information on product at right, specify 3457 see information request blank opposite last page.



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Plasticizers: experienced, excellent character, salary reasonable

When industry has to "hire" a plasticizer, it calls Celanese. This has proved to be the most efficient way to obtain plasticizers with the right application experience . . . with the right chemical characteristics . . . and at the right price.

Reason for this is Celanese research—a continuing program to develop plasticizers of greater service for industry. For instance: this program has already produced four grades of flame-resistant Tricresyl Phosphate—four practical means for building fire resistance into a wide range of consumer and industrial products.

Research to develop plasticizers that satisfy specific needs . . . producing these in commercial volume to assure supply and economical cost . . . this is another example of Celanese filling the critical job requirements of industry.

Celanese Corporation of America, Chemical Division, Dept. 591-B, 180 Madison Avenue, New York 16, N. Y.

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Basic reasons . . . . . for improved products

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Aldehydes	Glycols	Salts	Aviation	Plastics
Anhydrides	Ketones	Solvents	Building	Surface Coatings
Esters	Oxides	Vinyl Monomers	Electrical	Textiles

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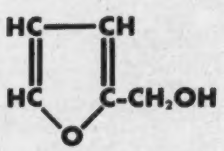
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, New York 16

Curiosity is the key to progress

This curious gentleman will be happy to learn of progress in wood-to-wood glues through the use of FA

You can profit from curiosity about QO FA®



QO FURFURYL ALCOHOL is a simple heterocyclic compound consisting of a furan nucleus and a hydroxymethyl group. FA is useful for these purposes:

1. As a resin former for the manufacture of black thermosetting resins that resist acids, alkalies and solvents
2. As a resin ingredient
3. As a solvent for resins and dyes
4. As a wetting agent and reactive solvent
5. As an additive in making gap-filling adhesives from urea-formaldehyde resins
6. As a modifier in the manufacture of asphaltic battery cases

FA'S ready availability and low cost is prompting research by industries with products and processes akin to the above. If you are one of these, be curious about QO Furfuryl Alcohol.

Bulletin 205 tells all about FA—Send for your copy!

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In Australia: Swift & Company, Ltd., Sydney
In Japan: F. Kanematsu & Company, Ltd., Tokyo

Check 3458 opposite last page.

Polyethylene resin has low viscosity, handles as melt

Addition of 25% paraffin will cut viscosity more

Uses: In melt casting, as a hot dip for protective coatings, and in hot melt application to paper.

Feaures: On paper, hot melt coating compares favorably to those of extruded plastic grade polyethylenes. Yet it can be applied to either one or both sides of paper in conventional wax coating machines, with minor modifications.

In melt casting, low-viscosity polyethylene can form relatively hard, tough cast or slush molded objects such as dolls or toys. As a hot dip, it can protect a wide variety of products.

Description: Low-viscosity polyethylene resin can be handled much like a moderate to high melting point wax, yet has many of the properties of plastic grade resins.

Its viscosity at 300°F, for example, is 8000 cps. Addition of 25% paraffin, with which it is completely compatible, cuts viscosity to 1300 cps at this temp.

(Epolene "C" is a product of Eastman Chemical Products, Inc., subs. of Eastman Kodak Co., Kingsport, Tenn.)

Check 3459 opposite last page

Phenolic resins for paper impart water resistance and are low in cost

Synthetic resins are used to impregnate various types of paper in order to increase wet strength and tear resistance, and improve appearances.

Until recently, principal resins were the ureas and melamines. Now phenolics are coming into general use because of their chemical resistance, toughness, and relatively low cost. Phenolics are of particular value when used with rubber latices in "fortified" papers. With them, it is possible to build up structural components for use in auto

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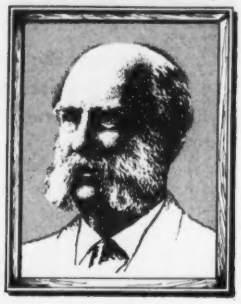
Check 3460 opposite last page.

Excerpts From The Chemical Hall of FAME



James Mason Crafts
(1839-1917)

In 1911 Crafts was awarded the Rumford medal by the American Academy of Arts and Sciences for his investigations into thermometry that were so accurate they are still regarded as classics.

By 1911 Foremost's El Dorado Division had been stressing purity and uniformity in their production control for nearly two decades.

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Check 3461 opposite last page.

armrests, flexible filter paper, gaskets, and shoe inner soles.

When phenolic resins are added during the paper-making process, colloidal-size resin particles are deposited on each individual fiber. When properly cured, the encasement is water-resistant. Resin can be added to the slightly alkaline paper stock, and then be precipitated onto fibers by addition of an acidic precipitant. Or, resin can be added to a stock which is already acidified. Retention of 85 to 90% of resin on fibers is normal.

Optimum properties are developed during cure. A proper cure would be 10 to 15 minutes at 250 to 350°F. A partial cure can also be made if the paper product is to be subsequently formed. Final oven cure of product develops the optimum properties.

Both liquid and powdered resins can be used. Addition of an antifoam will eliminate any troubles along this line.

(Phenolic paper treatment resins are product of Schenectady Resins Div., Schenectady Varnish Co., Inc., Schenectady 1, New York.)

Check 3462 opposite last page.

Citraconic anhydride used as intermediate, and in plastics

Uses: As curing agent for epoxy resins used in epoxide casting and laminating formulations; also in preparation of specialty polyesters for laminates, coatings, and polyurethane foams; and as chemical intermediate.

Features: Product undergoes many reactions quite readily. Its diesters can be polymerized.

Description: Citraconic anhydride has a five-member ring structure, and formula $(CH_3)CCHCOOCO$. It's available in pilot-scale quantities, and is a liquid.

(Citraconic anhydride—Commercial Development Div., Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, New York.)

Check 3463 opposite last page.

selective reducing agents, polymerization catalysts, anti-oxidants, stabilizing agents—

THE AMINE-BORANES

1

Dimethylamine-Borane, $(CH_3)_2NH:BH_3$; Trimethylamine-Borane, $(CH_3)_3N:BH_3$; and Pyridine-Borane, $C_5H_5N:BH_3$, are useful for reduction of aldehydes and ketones, for stabilization against color formation, for preparation of Diborane, as polymerization catalysts, and as petroleum additives.

Perhaps other Amine-Boranes would interest you. We can prepare these from secondary and tertiary amines—many primary Amine-Boranes lose hydrogen at room temperature to form aminoboranes. Let us know which complexes you think might be of use to you. For further information on the Amine-Boranes, write for Technical Bulletin C-200.

Phone: FOrest 4-1130 TWX: Perrysville, Pa. 117

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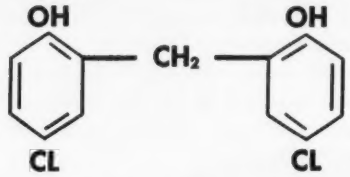
Check 3464 opposite last page.



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G-4 is safe to use, and it is used in cosmetic, pharmaceutical and veterinary products. It is light in color, low in odor. Other uses include textiles, cutting oils, disinfectants, paper, emulsions. We welcome your request for samples and technical information.

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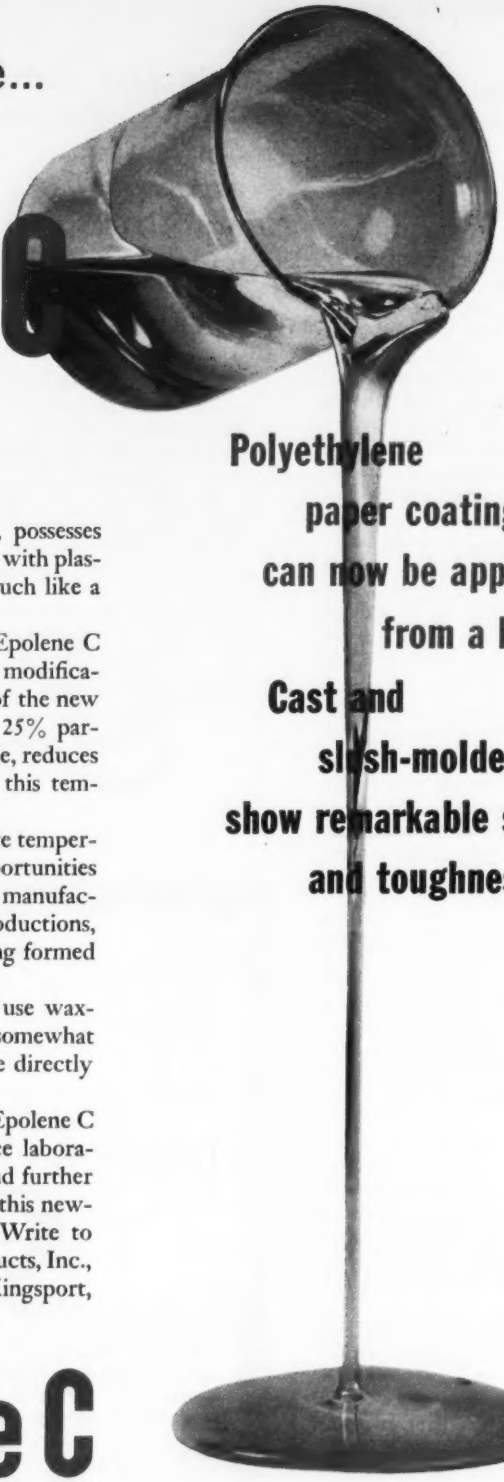
Industrial Aromatics and Chemicals
330 West 42nd Street, New York 36, N. Y.

Check 3465 opposite last page.

New low-melt polyethylene...

Epolene C



Polyethylene
paper coatings
can now be applied
from a hot melt
Cast and
slush-molded articles
show remarkable strength
and toughness

Epolene C, a new type of polyethylene, possesses many of the properties generally associated with plastic grade resins and yet can be handled much like a moderate to high melting point wax.

Because of its wax-like characteristics, Epolene C can be handled as a melt, with or without modification. At 300°F, for instance, the viscosity of the new resin is 8,000 centipoises. The addition of 25% paraffin, with which it is completely compatible, reduces the viscosity to only 1,300 centipoises at this temperature.

The pourability of Epolene C at moderate temperatures points the way to new product opportunities and low-cost production techniques in the manufacture of toys, novelties, art objects and reproductions, housewares or any product capable of being formed by slush or rotational molding or casting.

With Epolene C, paper converters can use wax-coating machines, modified to operate at somewhat higher temperatures, to apply polyethylene directly to paper sheets or web.

Investigation of these and other uses for Epolene C is continuing at Eastman's customer service laboratories. We will be glad to supply samples and further information and to assist you in evaluating this newest addition to the polyethylene family. Write to Chemical Division, Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Company, Kingsport, Tennessee.

Epolene C

EASTMAN LOW-MELT POLYETHYLENE

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Massachusetts; Cleveland; Cincinnati; Chicago; St. Louis; Houston. **West Coast: Wilson Meyer Co.,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

Check 3466 opposite last page.

Lead-epoxy compound gives greater hardness, bars radioactivity

Furnished in lead loadings up to 95% by weight

Uses: For constructing shields for nuclear installations and for containers used to ship radioactive materials.

Features: This material can be furnished in various lead loadings up to 95% by weight, and it offers wide range of hardness. Tests are said to show that castings made from resin containing maximum lead concentration exhibit greater hardness and rigidity than pure lead.

Description: Lead-filled epoxy formulation, when mixed with a specially developed catalyst, sets completely after brief room-temp cure. Castings have smooth surface which resists oxidation, corrosion, and contamination by most chemicals.

(Maraset Resin 341 is available from Marblette Corp., 37-31 30th St., Long Island City 1, New York.)

Check 3467 opposite last page.

Cartoon submitted by Tom Blakley, Florida East Coast Fertilizer Co., Homestead, Fla.

AROMATICS for the TEXTILE INDUSTRY

Modern textile technology today embraces not only the performance of its diverse products, but the essentials of merchandising as well. Saleability begins in the plant and one of its newest assets is the elimination of unpleasant odors, often the by-product of an essential process. The materials used for **dyeing, finishing, cleaning, softening** no longer need to leave obnoxious residual odors to interfere with a final sale. Through the skill of the industrial perfumer they can be masked, or changed into a pleasant fragrance. The D&O Industrial Odorants Labs have solved this problem for a number of textile manufacturers...on both natural and synthetic fibers. Inquiries are invited.

Write for copy of article, "Aromatics In the Textile Industry".

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Check 3468 opposite last page.

Heat-sealable coating improves properties of packagings

Uses: For coating paper as well as polyethylene, cellophane, and polyester films.

Features: Moisture-vapor transmission as well as gas permeability is significantly reduced in many packaging materials by use of this coating. Material increases oil, grease, flavor retention and abrasion resistance. It provides a polyethylene film of greater clarity, improved gloss and slip, and gives improved chemical resistance to wide variety of packaging materials.

Description: Product is a Saran resin but is differentiated from other Saran resins by its low viscosity and complete solubility in acetone. As a lacquer, it is particularly desirable as coating where low-cost, easy-to-remove solvents are needed. It is adaptable to high-speed coating processes.

(Saran Resin F220 is product of The Dow Chemical Co., Midland, Mich.)

Check 3469 opposite last page.

Flame proofing material for cellulosics

Uses: As intermediate for pharmaceuticals, dyestuffs, and other organics.

Features: Material can be used as intermediate in flameproofing of cotton, paper, and other cellulosic materials. Several of the esters are used in treating leukemia and tumorous growths.

Description: Methanesulfonyl chloride is pale yellow liquid boiling at 164°C and freezing at −32°C. It is soluble in most organics and insoluble in water. It reacts with reducing agents, alcohols, phenols, ammonia, amines, active methylene compounds, and various other groups.

(Methanesulfonyl chloride in development quantities — Stauffer Chemical Co., 380 Madison Ave., New York 17, New York.)

Check 3470 opposite last page.

bacteriostatic, fungistatic and surface-active agents; polymer components—

THE ALKYL BORIC ACIDS

2

Three new organoboron compounds—Chloropropyl Boric Acid, $ClC_3H_6B(OH)_2$, Nonyl Boric Acid, $C_9H_{19}B(OH)_2$, and Dodecyl Boric Acid $C_{12}H_{25}B(OH)_2$—are available in developmental quantities. They are very weakly acidic, oxidize about as readily as aldehydes, and are stable to hydrolysis.

Tests show interesting bacteriostatic, fungistatic, and surface-active properties. Usefulness is indicated in products requiring resistance to rot and fungal attack. Some patented uses are: as organic-inorganic polymer intermediates, as petroleum additives, and as stabilizers for aromatic amines. Write for Bulletin C-710.

Phone: FOrest 4-1130 TWX: Perrysville, Pa. 117

GALLERY CHEMICAL COMPANY

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highly reactive, white to gray solid, useful as condensing agent, reducing agent, and intermediate for preparation of other hydrides—

SODIUM HYDRIDE (NaH)

3

Sodium Hydride, in mineral oil, gives better yields than sodium or sodium alkoxides in a variety of mixed ester and keto-ester condensations, carbethoxylation of ketones, and other reactions. NaH is an excellent drying agent for inert liquids. It can be used for preparation of pure alkoxides.

Sodium Hydride in mineral oil can be handled safely in air without hydrolysis. NaH dissociates completely at 425° (1 atm. H_2). It is insoluble in common solvents; soluble in certain molten salts and metals. Write for Technical Bulletin C-410.

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Check 3473 opposite last page.

new arrival- 17 years old...

NOW—VALDURA CHEMICAL RESISTANT COATINGS MADE WITH VINYL RESIN

A leader in the paint and maintenance field, Valdura scores another first with a *complete* line of chemical resistant products. Latest addition: Val-Chem #640 series—a new vinyl system based on a proved formula under development by Stoner-Mudge since 1941.

FREE literature on Valdura Val-Chem #650 series (made with chlorinated rubber), #630 series (made with Epon resin), Val-Chem #690 series (made with modified epoxy resin), Val-Chem #640 series (made with vinyl resin) and Val-Chem #660 series, latest type of urethane coating that holds up where all others have failed. Request on company letterhead.

VALDURA PAINTS THAT ENDURE
VALDURA HEAVY-DUTY PAINT DIVISION
AMERICAN-MARIETTA CO. · 101 E. Ontario St. · Chicago 11, Ill.

Check 3474 opposite last page.

CHEMICAL MATERIALS

Clear, fatty alcohol ester has heat, color stability, low odor, non-volatility

Uses: Material is heat-stable lubricant for high-impact polystyrene. When emulsified it makes a textile finish, and when saponified it makes a superfating agent. Other applications include lubricants, rust inhibitors, textile sizes, fatty alcohol manufacture, and use in lacquers, especially for tin cans, to give slip and a lubricated surface.

Features: Clear material is heat-stable and changes color very little when heated to 290°C. It is said to have little odor, is non-volatile, and will not oxidize or change when exposed to heat, light, and air.

Description: Waxes are a blend of higher fatty alcohol esters of C-16 and C-18 normal straight chain alcohols and fatty acids. Minor amount of fatty alcohols and fatty acids of shorter chain length is also present. Physical properties are:

Melting point (°F)	115-122
Color (max)	10Y-1.0R
Saponification number	122 to 130
Iodine number (max)	1.0
Unsaponifiable (fatty alcohols)	43 to 5%

(Hywax 135 is product of Werner G. Smith, Inc., 1730 Train Avenue, Cleveland 13, Ohio.)

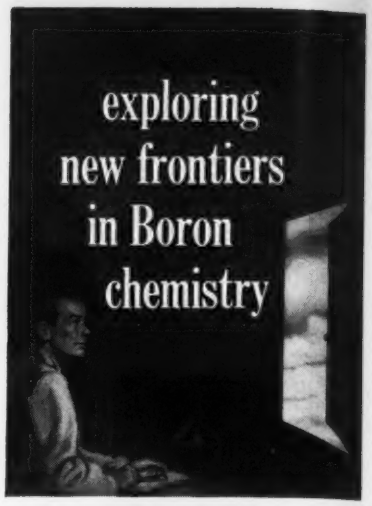
Check 3475 opposite last page.

Phenylenediamine-type antiozonant

Phenylenediamine-type antiozonant for rubber is effective in from 1 to 2 pphr, from ½ to 1/3 the amount required of other commercially available antiozonants. Identified as N,N′-Dimethyl-N,N′-di-(1-methylpropyl)-p-phenylenediamine, Eastozone 32 gives lower overall cost for equal ozone protection.

(Eastozone 32 is product of Eastman Chemical Products, Inc., Subsidiary of Eastman Kodak Co., 260 Madison Ave., New York 16, N. Y.)

Check 3476 opposite last page.



Latest addition to Trona's* growing list of boron intermediates... **boron halides...**

do they have a place in your product's future?

Boron Trichloride

Boron Tribromide

You might benefit from TRONA's own basic research in these highly reactive compounds, BBr_3 and BCl_3, versatile as raw materials in the production of *elemental boron* and boron hydrides, as well as a variety of other uses.

Both compounds have been suggested as polymerization catalysts. BCl_3 has been proposed as a Friedel-Crafts condensing agent for organic synthesis, as a catalyst in inorganic reactions, and is particularly effective for the control of magnesium metal fires. It has been patented for stabilization of sulfur trioxide.

If you're concerned with the use of boron intermediates, write us today. TRONA's leadership in boron technology is your assurance of purity and uniformity to meet the most critical requirements.

*TRADEMARK AP&CO

MARKET DEVELOPMENT DEPARTMENT
TRONA
American Potash & Chemical Corporation
3030 West Sixth Street, Los Angeles 54, California | 99 Park Avenue, New York 16, New York

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U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

New Non-Narcotic Drug Has Potency of Codeine

A new analgesic drug — dextro propoxyphene — is now on the market. It is reported to be clinically equivalent to codeine in intensity of analgesia, and in onset and duration of action. At the same time, side effects are said to be fewer. No toxic effects on liver, blood, brain, kidneys or other organs have been demonstrated. And, after several years of exhaustive tests, government authorities have classified the material as non-narcotic drug — producing no euphoria, tolerance or physical dependence.

Dextro propoxyphene hydrochloride also acts as an antipyretic, reducing fever, and as an anti-inflammatory, combatting local hyperemia and swelling. Clinical usefulness is expanded by combining this amino ester with other ingredients such as acetophenetidin, caffeine and acetylsalicylic acid.

Although chemically different from all other analgesics, it is believed to act in the same manner as meperidine, codeine and morphine — that is, by raising the pain perception threshold through depression of the sensory area of the brain.

Riboflavin Overcomes Boron's Growth Inhibition

A European microbiologist has found that riboflavin overcomes the growth inhibition of test organisms caused by boron. None of the other B vitamins have this effect.

These findings may have some importance in areas such as the American southwest where the soil has a high boron content. Boron is taken from the soil by plants which are consumed by livestock, and the element may tend to interfere with the vitamin metabolism of these animals.

Viscosity Changes May Be Clue to Chemical Activity In Complete Ester Mixtures

Investigations reported in the literature have revealed that the viscosity of true ester mixtures of ethyl alcohol, acetic acid, ethyl acetate and water changes steadily on standing. The conclusion is that association, dissociation, hydrate and solvate formation are taking place, and that viscosity determinations may therefore be useful in studying the progress of such activity.

Viscosity has long been employed to determine the extent of molecular association, and the degree of solvate and hydrate formation in liquid mixtures at some particular moment. It has never been used, however, to examine changes over time intervals.

In the study reported, relative viscosity measurements were made on complete ester mixtures after 2, 9, 21, 51, and 84 days. Viscosities changed steadily, but tended to reach an equilibrium value. The investigators feel that this time factor must be properly evaluated before further study of hydrates, solvates and association values is made.

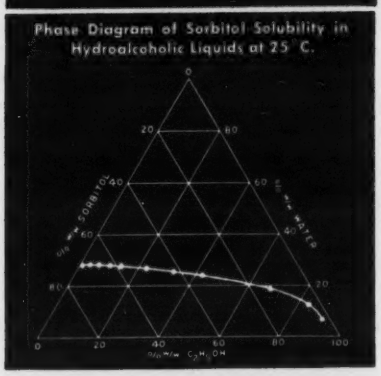
Sorbitol Solubility Measured In Elixirs and Syrups Containing Alcohol and Water

Studies Reveal Solubility of Sorbitol in Water-Ethanol Mixes

The hexahydric alcohol, sorbitol, widely used in liquid pharmaceutical preparations, has now been thoroughly studied in water-ethyl alcohol systems to determine extent of solubility. The table and phase diagram below show the results of this investigation. They indicate that a sizable amount of sorbitol can be incorporated into most pharmaceutical systems of hydroalcoholic character—about 65% by weight in 20% alcohol, about 50% by weight in 50% alcohol, about 14% by weight in 80% alcohol, and so on.

SOLUBILITY OF SORBITOL IN HYDROALCOHOLIC LIQUIDS AT 25°C.

Sample	% v/v C_2H_5OH	Sp. Gr. Saturated Solution	% w/w Sorbitol	% w/v Sorbitol
1	0	1.308	71.90	94.05
2	11.33	1.284	68.62	88.22
3	20.73	1.265	66.02	83.50
4	33.86	1.233	62.38	76.92
5	41.47	1.200	57.98	69.59
6	52.80	1.152	50.45	58.12
7	62.33	1.089	42.70	46.49
8	71.56	1.026	33.84	34.72
9	82.20	0.9123	13.64	12.42
10	90.94	0.8433	3.41	2.88
11	95.41	0.8177	1.92	1.57



It has been well known for some time that while sorbitol is highly soluble in water alone, the solubility tends to decrease when ethyl alcohol is added. Since sorbitol acts as a vehicle in many cough syrups, elixirs and vitamin preparations which contain alcohol, the extent of this decrease has become a question of great interest to the industry. Until this study was made, no data on the subject had been available.

Properties which have made sorbitol useful to the food and drug industries include sweet

MORE

Polyethylene Use Is Extended by New Compounding Process

A process, whereby polyethylene is combined with 50% or more of carbon black to create compositions which remain flexible even at extremely low temperatures, has been developed by Godfrey L. Cabot, Inc.

These compositions are said to be strong enough for structural use where rigidity and pressure resistance are important. Creep and fracture are reported to be minimum.

A variety of molded and extruded parts have been fabricated successfully from the new material. Pipe, for example, has exhibited resistance to stress cracking, improved high temperature behavior, virtual elimination of plastic flow, and improved resistance to deterioration by solvents and oils. Lab tests have indicated that burst strength is doubled. The same applies to wire and cable cover.

Cabot feels that the development makes possible a new range of usefulness for polyethylene. They will not manufacture these compositions themselves but will supply the carbon black and their process knowledge to polyethylene producers such as U.S.I.

New Ceramic Textiles Withstand Heat of 2000°F

Aluminum silicate fibers have now been converted into a variety of textile forms for high temperature applications.

Fabrics weighing from 15 to 74 ounces per square yard are said to have excellent insulating properties due to low thermal conductivity, high yarn bulk, natural resilience and small fiber diameter. Stainless steel or nickel-chrome alloy wire is inserted into some constructions for greater tensile strength in the 1,000 to 2,000°F range.

Rovings and yarns in sizes from 600 to 1,000 yards per pound are useful as insulation for electric circuits that must withstand very high temperatures.

Rope from ¼ to ¾ inch in diameter is being applied as insulation and packing in various metallurgical refining processes.

Other suggested uses for cloth and tape include filter media, gaskets, heat and flame barriers and membranes, conveyor belts, protective clothing and insulating blankets.

U.S.I. CHEMICAL NEWS

CONTINUED

Sorbitol

taste (about 60% as sweet as sucrose), high viscosity in water solution, lack of reaction with medicinal or other ingredients, ability to inhibit crystallization, and humectant action. It is often used in combination with glycols, glycerin and sugar syrup as well as ethyl alcohol.

Paper Can Now Be Made From New Acrylic Fibers

A new type of paper has been developed which will be of special interest to the laminating industry and for electrical uses, chemical filtration, chromatography and many other applications.

It is made of a new acrylic fiber, is binder-free, and can be produced on conventional machinery. Production quantities are expected in the near future.

First Caustic Soda Plant Established in Ceylon

May Also Produce Bromine

The first caustic soda factory in Ceylon, built by a government-sponsored corporation, is expected to begin operations this month. It is equipped with 56 electrolytic diaphragm cells having a daily output capacity of five tons of caustic soda.

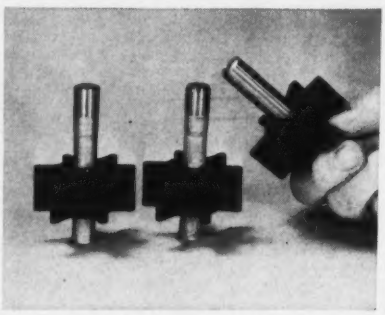
Bromine may also be produced. In the manufacture of common salt from sea water, a nearby factory discards thousands of tons of bromine-rich waste liquors. Engineers are considering the production of high-grade elemental bromine from these wastes.

Titanium Impeller Shaft Solves Corrosion Problem In Pumping Ferric Chloride

Impeller shafts of commercially pure titanium are now being used in pumps to carry ferric chloride solutions. They are reported to yield at least 320 hours of pump service without leakage. Materials tried previously — special ferrous and non-ferrous alloys, and platings of nickel, silver and rhodium — have given maximum service life of 45 minutes due to corrosion of the shaft and loss of tight seal.

The titanium impeller shaft was originally incorporated into a prototype pump unit and tested to solve a particular problem in the etching of printed circuits. It was found that the prototype unit would run for at least 321 hours without damage. And the initial cost of the special shaft was offset in the first 90 minutes of operation. The pump is now a regular production item.

Mallory-Sharon Titanium Corp., now affiliated with U.S.I. in the new Mallory-Sharon Metals Corp., participated in the original test runs by supplying the titanium.



At left are two impeller shafts which failed after 45 minutes of pumping ferrous chloride. Both are made of premium metals, one ferrous, one non-ferrous. At right is a titanium impeller shaft showing no sign of corrosion after two months in the same service.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Research reactors now in operation or being built in the U.S. are reviewed in a new booklet which can be purchased from gov't. Data and illustrations on over 30 reactors are included. **No. 1311**

A marking pen consisting of a heavy-wall polyethylene squeeze tube with felt writing point, filled with ink that writes on porous and non-porous surfaces, is now on the market. It is low-cost, disposable, comes in 7 colors. **No. 1312**

New fuel oil additives to prohibit gum formation in oil stocks are fatty amine derivatives claimed to also protect against color degradation and to improve filterability. **No. 1313**

Over 1,500 assayed biochemical compounds, along with their full specifications, are listed in a new reference guide for workers in bacteriological, nutritional, biological and microbiological research. Price list included. **No. 1314**

Three new hydrazine derivatives are available in lab quantities. Hydrazine dihydrochloride is suggested as a chlorine scavenger for hydrochloric acid, hydrazodicarbonamide as a chemical intermediate, monohydrazinium phosphate as an oxygen scavenger for boiler feed water. **No. 1315**

Analytical microscopy relative to foods, drugs, spices, water is discussed in a new book which can be purchased. The 215-page book describes preparation of materials for examination, gives examples of problem solutions. **No. 1316**

Isocinchomeronic acid, suggested intermediate for drugs, insecticides, polymers, dyes, is now offered commercially. Its ring-nitrogen is said to offer possible increased dye receptivity in polymer applications. **No. 1317**

Remote evaporation and drying by infrared radiation is now possible with a new heater for lab and semi-industrial use. Placed above a flat crucible, the radiator is claimed to evaporate without boiling or loss of material. **No. 1318**

New acid inhibitor has been developed which, it is said, can be used on high carbon steel without etching. It is used at about 0.2% by volume, added to non-oxidizing acids such as sulfuric, hydrochloric, hydrofluoric, oxalic. **No. 1319**

Molded polyethylene waste and drainage systems are now on the market. According to the manufacturer, traps, pipe, joints, fittings will withstand intermittent flushing with boiling water without deterioration or loss of form. **No. 1320**

PRODUCTS OF U.S.I.

ALCOHOLS

Ethyl Alcohol (Ethanol): Specially denatured — all regular and anhydrous formulas. Completely denatured — All regular formulas for industrial use, anti-freeze. Pure alcohol — USP 190° — Absolute, N.F., taxfree, taxpaid.
Butanol (Normal Butyl Alcohol): Latent solvent for nitrocellulose, solvent for ethyl cellulose, many resins, many syntheses.
Amyl Alcohol, Refined: Fine chemicals, pharmaceuticals.
Fusel Oil, Refined: Blend of amyl alcohols refined by chemical treatment, distillation.
Proprietary Denatured Alcohol Solvents: SOLOX® — General-purpose. FILMEX® — Special, authorized for certain industries. ANSOL® M — Anhydrous, special blend for lacquers, resins, etc. ANSOL® PR—Anhydrous, special blend with higher ester content and solvency for lacquers, resins, etc.

OTHER PRODUCTS

PETROTHENE® Polyethlene Resins
Inorganic Chemicals: Sodium, Chlorine, Caustic Soda, Sodium Peroxide, Sodium Sulfate, Sulfuric Acid, Phosphatic Fertilizer Solution (Wet Process Phosphoric Acid) Ammonia, Nitrogen Fertilizer Solutions, Ammonium Nitrate, Zirconium Oxide, Zirconium Tetrachloride, Hafnium Oxide, Hafnium Tetrachloride.
Esters, Ethers and Ketones: Normal Butyl Acetate, Dibutyl Phthalate, Diethyl Carbonate, Diethyl Oxalate, Ethyl Acetate, Ethyl Ether, Acetone, Diatol®.
Intermediates and Fine Chemicals: Acetoacetarylides, Dimethyl Hydrazine, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Chloride, Ethyl Sodium Oxalacetate, U.S.I. ISOSEBACIC® Acid, Methyl Hydrazine, Sodium Ethylate Solution, Triethyl Aluminum, Trimethyl Aluminum, Urethan USP (Ethyl Carbamate).
Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curbay B-G® 80, Special Liquid Curbay®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B_{12} and Antibiotic Feed Supplements, Vacatone® 40, Vitamin D_3, E and K_3 Products, Antioxidant (BHT) Products, U.S.I. Premadry Products (Sealed-in Vitamin A), Special Mixes, MOREA® Premix.
Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.
Metals: Titanium, Zirconium and Hafnium Sponge and Platelets, and Oxide.

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Reactive intermediate: methallyl alcohol

Of interest in specialty rubbers, adhesives, coatings

Uses: In organic synthesis, and in resin and plastics field. Derivatives of interest in making adhesives, protective coatings, molding powders, castings and laminates, safety glass liners, specialty rubbers.

Features: Material is reactive intermediate for preparation of methallyl derivatives, as well as being monomer in polymerization reactions.

Description: Methallyl alcohol (2-methyl-2-propene-1-ol) is available in development quantities. Tentative specs:

Purity (% min)	98.0
Sp gr (20°/20°C)	0.852-0.856
Distallation range (°C)	110-116
Color (APHA, max)	20

(Methallyl alcohol is available from Organic Chemicals Div., Food Machinery and Chemical Corp., 161 East 42nd St., New York 17, New York.)

Check 3478 opposite last page.

Esters from azelaic acid have good heat stability, corrosion inhibition

Uses: To make dibasic acid esters for low-temp plasticizers and synthetic lubricants.

Features: Esters produced from azelaic acid have improved heat stability, corrosion inhibition qualities.

Description: Azelaic acid is a straight-chain 9-carbon acid being produced on pilot plant basis. Azelaic acid content is 92.0% and total dibasic acid content is >99.0%. Melting point is 106°C.

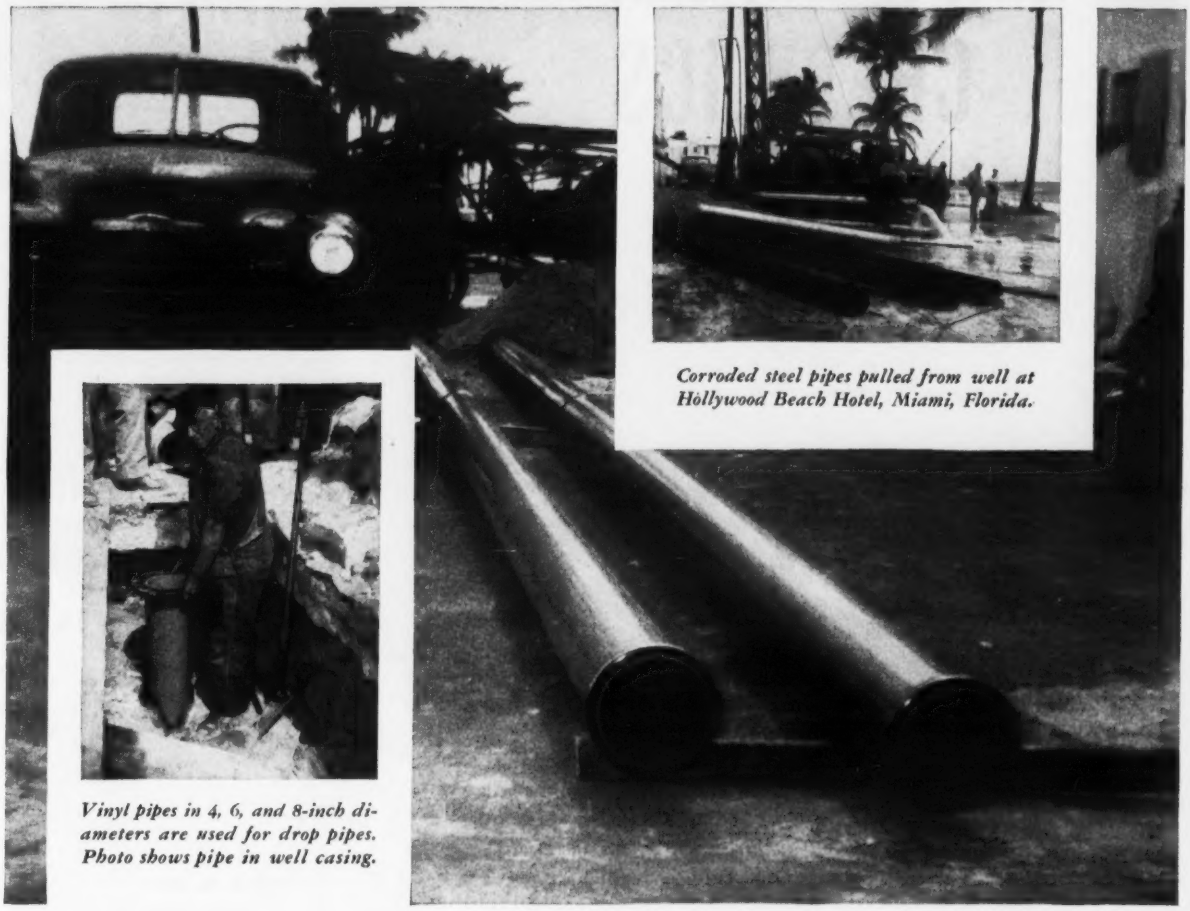
(Azelaic acid is product of Chemical Div., Armour and Co., 1355 W. 31st St., Chicago 9, Ill.)

Check 3479 opposite last page.

For more information on product at left, specify 3480 . . . see information request blank opposite last page.

Another new development using

B.F.Goodrich Chemical *raw materials*



Corroded steel pipes pulled from well at Hollywood Beach Hotel, Miami, Florida.

Vinyl pipes in 4, 6, and 8-inch diameters are used for drop pipes. Photo shows pipe in well casing.

SO THEY REPLACED THE CORRODED PIPE

WITH GEON RIGID VINYL

DEEP wells are often used to provide cooling water for refrigeration systems. In the Miami, Florida, area wells supply salt water—fine for cooling but rough on steel drop pipes that in many cases have corroded and failed in less than 18 months.

Now rigid vinyl pipe made of Geon polyvinyl materials is used for the drop pipe which slips inside a driven steel casing. This vinyl pipe is unaffected by salt water, as well as galvanic corrosion. A built-up plastic O-ring at the bottom of each drop pipe seals the pipe within the casing.

Geon vinyl pipe makes a big hit with installation crews too. It's lightweight and easy to handle. As the pipes are lowered into the casing, they are readily assembled with a coupling by solvent welding into a continuous length that may extend to a depth of 200 feet.

In any piping system where you have a corrosion problem, consider rigid vinyl pipe made of Geon. For informative booklet write Dept. LJ-2, B. F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B.F.Goodrich Chemical Company
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B.F.Goodrich GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

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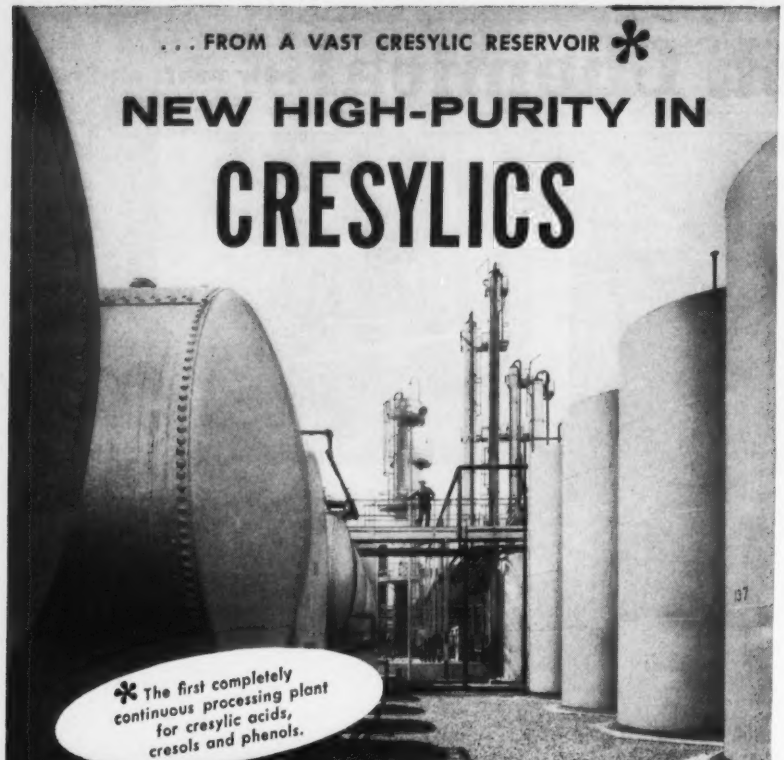
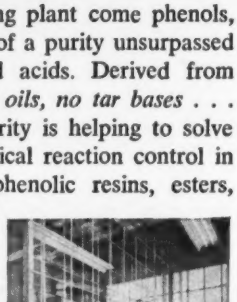
. . . FROM A VAST CRESYLIC RESERVOIR *

NEW HIGH-PURITY IN

CRESYLICS



From PITT-CONSOL's vast refining plant come phenols, cresols, xylenols and cresylic acids of a purity unsurpassed by any other producer of refined acids. Derived from petroleum, they contain *no neutral oils, no tar bases . . . practically no sulfur.* This high purity is helping to solve problems of color, odor, and chemical reaction control in many plants where high grade phenolic resins, esters, pharmaceuticals, detergents, disinfectants, solvents and other end products are produced.



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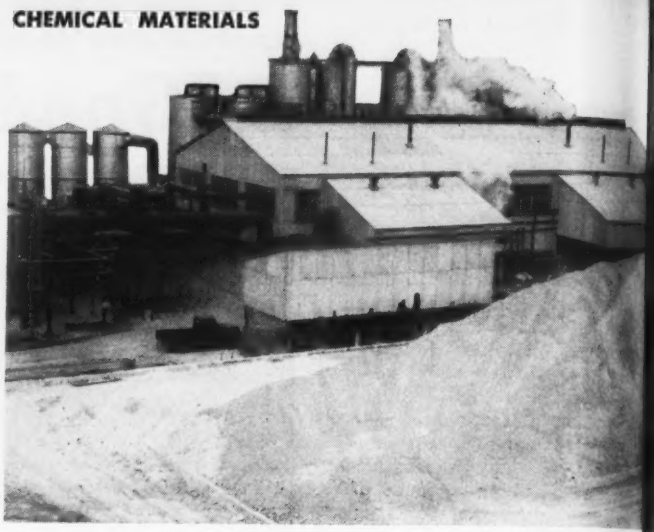


Filtering of molten sulfur before making H_2SO_4 is aided by cellulose

Any filter aid that passes screen will oxidize, and therefore won't foul catalyst

FRANK McELROY, Associate Editor
With **DAVID C. YOUNG,**
Assistant Acid Superintendent
United States Rubber Co.
Joliet Arsenal — Kankakee Unit

Problem: Although sulfur is quite pure when it is mined by the Frasch process, it is stored, barged, and trucked in the out-of-doors where dust and dirt can contaminate it easily. At the Joliet Arsenal's sulfuric acid works in Elwood, Illinois, Frasch sulfur is catalytically oxidized to the trioxide and this in turn made into 109% H_2SO_4 (40° oleum.)

However, before the sulfur is burned to SO_2 for catalytic oxidation to SO_3, all the impurities which it has picked up must be removed. Otherwise these will pass up into the catalyst bed with the sulfur dioxide, plugging the converters and cutting production.

In filtering out these impurities, an upright filter is used. Formerly, inorganic filter aids were used to precoat the filter screen. Although these performed satisfactorily, there was one major drawback.

Every once and a while the filter screens "gave" a little bit, and permitted a few pounds of the inorganic filter aid to enter the converters along with the sulfur dioxide. This caused the bed to plug and required expensive catalyst screening and shutdown.

Solution: In September 1955, acid plant began experimentation with a cellulosic material made from wood pulp. Half a year later, last spring to be exact, they switched to the use of this material — Solka Floc BNB 20 — as a filter aid.

Here's what they found to be the best way to use it.

Thirty-five pounds of filter aid is mixed with molten sul-

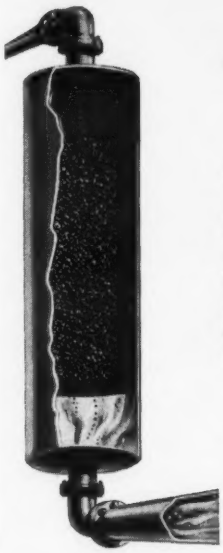
Overall view of Joliet Arsenal sulfuric acid plant. Outdoor storage and handling of elemental sulfur introduces inorganic impurities, necessitates filtering

fur in a precoat tank. This mixture is circulated through the filter, allowing the precoat material to be deposited on the filter screens. Because of its large bulk density, only 35 pounds of Solka Floc is required, compared to 100 pounds of the inorganic aids.

When the screens have been coated with the filter aid, the filter is placed in service. During operation, the filter aid/sulfur ratio is 35 lb additional Solka Floc to each 90,000 lb of bright sulfur melted. This additional filter aid is added in the agitated melt pits. A small amount of lime is also added to neutralize the sulfur. This protects the filter screens and the sulfur melting coils.

The filter is cleaned after approximately 600,000 lb of sulfur has been filtered. Filter cake is easily removed. Filter screen holes are not "blinded" as can happen with inorganic aids.

Results: The greatest advantage achieved by using cellulosic material in filtering molten sulfur is that now any filter aid that might pass through the filter screen is decomposed when the sulfur is oxidized. Another advantage is that the fibrous nature of the cellulosic filter aid allows its fibers to bridge over



Are you using a "boy" to do a "man's" job in your Adsorption System?

THE answer is probably "yes" if you still employ an inefficient batch-type operation with powdered activated carbons! And if you do, you owe it to yourself to investigate the many *positive* benefits of converting to a continuous column operation employing **Pittsburgh Granular Activated Carbons.** This modern adsorption system offers:

1. Greater capacity, lower carbon dosage, lower cost.
2. Higher product quality, better colors, higher purity.
3. Cleaner operation, no slurrying or dusting problems.
4. Less equipment and maintenance—the ultimate in simplicity of operation.

The use of coal-derived *Pittsburgh* Granular Carbons in continuous column operations has *drastically* reduced costs and increased efficiency in a wide variety of adsorption processes, including decolorization, purification and catalysis. Our technical representatives will be glad to help you set up a small scale laboratory column to prove how *you* can benefit, too. *Write us the details of your problem today!*

Want More Information? Send for this Booklet

There's a type of Pittsburgh Granular Carbon ideally suited to solve your particular adsorption problem. Write for folder describing Pittsburgh Activated Carbons in both liquid and vapor phase applications . . . it's free.

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You need 14 pounds of talc to equal the absorption of 1 pound of MICRO-CEL®

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• No matter what your absorption problems may be, chances are you'll find the answer in Micro-Cel—Johns-Manville's new line of synthetic calcium silicates.

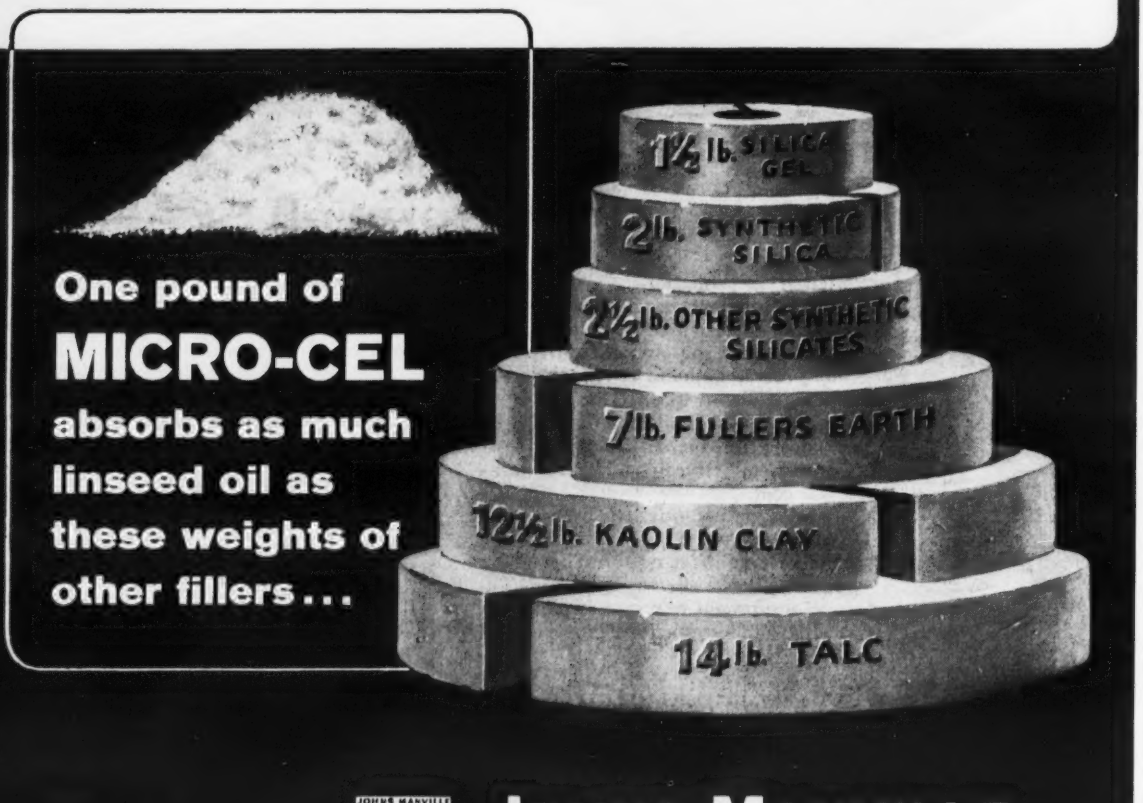
Pound for pound, Micro-Cel gives you far more absorption than common fillers like talc and clay . . . even outperforms products like silica gels selling for as much as 10 times Micro-Cel's delivered cost of 8¢ to 10¢ per pound.

Dollar for dollar, Micro-Cel's high absorption also wins out over both low cost and high cost fillers. Only 28¢ worth of Micro-Cel will convert a full gallon of liquid to a dry free-flowing powder. As little as 12¢ worth provides ultimate absorption of a gallon of water.

Industry is putting these properties of Micro-Cel to work in several types of applications: as an absorptive carrier to convert a liquid to a dry free-flowing powder; as a means of drying semi-solids to desired degree; to disperse liquids uniformly in a dry compound; to absorb moisture and reduce drying costs; to control liquid viscosity up to a paste or semi-solid; to assure good free flow properties of deliquescent crystals or powders.

Micro-Cel, the powder that flows like a liquid is a new line of inert synthetic calcium silicates produced by combining lime with diatomaceous silica under carefully controlled conditions. In addition to high absorption, it provides particle size as small as .02 micron and bulking action up to a full cubic foot for every three pounds.

For further information, samples and technical assistance, write to Johns-Manville, Box 14, N.Y. 16, N.Y. In Canada, Port Credit, Ontario.


One pound of
MICRO-CEL
absorbs as much linseed oil as these weights of other fillers . . .
1½ lb. SILICA GEL
2 lb. SYNTHETIC SILICA
2½ lb. OTHER SYNTHETIC SILICATES
7 lb. FULLERS EARTH
12½ lb. KAOLIN CLAY
14 lb. TALC

JOHNS MANVILLE JM PRODUCT

JOHNS-MANVILLE

Micro-Cel is a product of the Celite Division

Check 3484 opposite last page.

CHEMICAL MATERIALS

small tears in the filter screens to give more efficient filtering.

As far as the efficiency of the filter and filter aid, this is shown by analysis of the filtered sulfur. Ash content, determined by combustion analysis, consistently runs below 0.003%.

(Solka Floc BNB 20 is a product of Brown Co., Berlin, N.H.)

Check 3485 opposite last page.

Potato starch components

Amylose and amylopectin, principal components of potato starch, are being marketed commercially for the first time in the US.

Amylose (Superlose), possessing film-forming properties, should find use in textiles and paper coating. Big potential is in packaging films for foods and drugs.

Amylopectin (Ramalin), which has properties somewhat like amioca, has been used in textile sizing and finishes to stiffen and strengthen fibers, prevent fuzziness. It also has applications in paper sizings and coatings, and is used in the food field as a suspending agent.

These are produced through an agreement with AVEBE (Coop. Verkoop-en Productievereniging van Aardappelmeel en Derivaten) of The Netherlands.

(Superlose and Ramalin are available from Stein Hall and Co., Inc., 285 Madison Ave., New York 17, N.Y.)

Check 3486 opposite last page.

Low-cost peptones for fermentation

Low-cost peptones made by enzymatic hydrolysis of animal proteins are available commercially for use in fermentation, in production of vitamins, antibiotics, and sterols.

(Proto-Peptone is a product of Wilson & Co., Prudential Plaza, Chicago 1, Illinois.)

Check 3487 opposite last page.

Cure time reduced 50% by two-step phenolic molding material

Features good mold-retention, fast mold closure

Uses: For cold-powder automatic molding or in other types of molding equipment.

Features: According to tests, material provides reductions in cure time up to 50%, as compared with fastest one-step and two-step phenolic molding material now on market. Retains mold-details well and permits fast mold closing speeds.

Description: Two-step phenolic molding material is a woodflour filled compound. Its physical and electrical properties are comparable with those of other general purpose phenolic molding materials. To insure fastest cure speeds with material, electronic pre-heating time should be reduced. Recommended pre-heating times are about 40% less than for a fast one-step material and about 20% less than for a typical two-step material.

(BMM-7000 Black 25 is product of Bakelite Co., Div. of Union Carbide Corp., 260 Madison Ave., New York 16, New York.)

Check 3488 opposite last page.

Weed killer is effective in diluted formulations, won't plug spray gun

Uses: To stabilize 2,4-D amine concentrates and prevent insolubilization of amine from aqueous solutions.

Features: When stabilized, weed killer remains at full strength in diluted formulations, and won't plug spray guns.

Description: Stabilizer is mixture of salts of lower-mw lignosulfonic acids and salts of alkaline reversion products of hexoses and pentoses, obtained from spent sulfite pulping liquors.

(Maracarb X-1 is product of Marathon Corp., Rothschild, Wisconsin.)

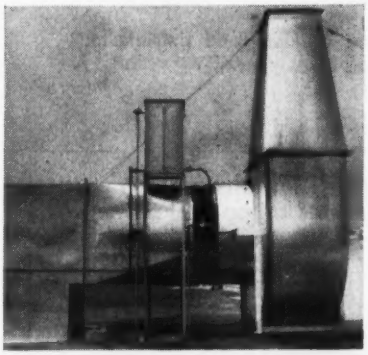
Check 3489 opposite last page.

They used guns to kill odors

some interesting examples of Airkem installations

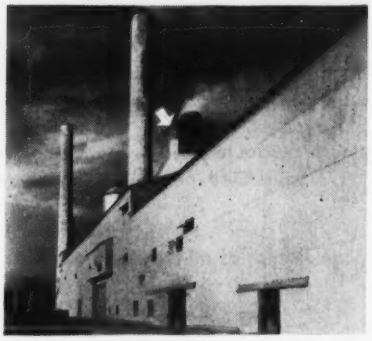
Spray guns are frequently used to vaporize Airkem odor control products for industrial application. Airkem has developed special formulas that are individually matched to the hundreds of different odor problems in industry. Here are some of the unusual examples of odor problems treated by the Airkem odor specialists.

Mercaptans, highly odorous products, are mixed in natural and manufactured gases by utility companies as a warning agent against leakage. In concentrated form they are almost unbelievably foul. A spray gun installed above the tank car vaporizes an Airkem odor control product at the loading station of a mercaptans manufacturer. Utility companies use the same product to control odors from leakage or spillage of mercaptans in their plants.



Sludge Drying has enabled many communities to convert sewage into an asset. Many plants have even made profits selling the dried sludge for fertilizer. However, the odor from the operation is not pleasant. To eliminate the odor problem in this installation, an Airkem spray unit was placed directly in the steel ducting that discharged the odorous air into the atmosphere. Equipment and controls are simple, easy to install and service.

Chemical Plants, such as this midwest ammonium sulphate installation, often create odors that disturb their neighbors. Management tried several techniques before learning about Airkem's effective and economical method. A plant employee is shown adjusting the spray gun for proper odor control.



Cement Plants have odor problems, too. Here is a New York State plant of a major cement company that uses an Airkem installation with excellent results. The odors, which smelled very much like hydrogen sulphide, caused a serious community relations problem when the wind carried them into the residential areas. The Airkem guns, installed at the top of the stack, quickly brought the odors under control.

Food Processing odors, like those released by this spaghetti sauce plant, are obnoxious to many communities. Normally zoning restrictions would have prevented this plant from operating in its present location. However, a small compressor-powered Airkem system solved the problem to the complete satisfaction of the neighborhood. Fish processors and many other food plants have also learned to rely on Airkem for effective odor control.

Odor Control Tests are continuous at Airkem's laboratory, the largest in the world devoted solely to odor studies. Here an Airkem engineer checks operation of a spray unit in the test room. Many types of evaporation equipment are used besides spray guns. There are hundreds of different formulas used by Airkem for their odor control work. Each odor is treated as a special problem, thus assuring a maximum effectiveness with minimum possible cost.

If you have an odor problem, describe it in the coupon below. We may be able to assist you in eliminating the problem. Write for information today.

airkem

Specialists in Odor Control

AIRKEM, INC. CP-28
241 East 44th Street, New York 17, N. Y.

Please send me information on industrial odor control.

My Problem is_____

Name_____ Position_____

Company_____

Address_____

City_____ Zone____ State____

Check 3490 opposite last page.

CO_2 the most economical inert gas

Carbon dioxide is a truly versatile chemical: a solid or liquid refrigerant... a pressure-producing and carbonating agent... a chemical that reacts with a select number of substances... and, in apparent contradiction to its chemical uses, a low-cost inert gas with a wide range of applications, many of which have hardly been exploited.

These inerting applications, in fact, may well eventually overshadow the generally accepted ones. Although CO_2 cannot be used in *all* inert gas applications, it can be used in many cases just as effectively as the more costly and less easily handled "elemental" inerts: argon, nitrogen, etc.

For example, here are just a few CO_2 inerting uses:

Blanketing explosives and combustibles . . . solvent dewaxers . . . alkyd resins (while also providing sufficient pressure for agitation) . . . within vessels to eliminate oxidation, skinning or bacterial growth from such materials as paints, varnishes, tall oils, etc.

Purging vessels prior to filling with special materials . . . lines, holders, tanks, etc., while under storage or being emptied . . . hydrogen-filled generators during repairs . . . gasoline and oil tanks, etc., under repairs.

Pressure transference of combustibles of all types without pumps.

Shielding welding arcs.

Reducing fire and explosion hazards while materials undergo grinding and pulverizing. CO_2 also reduces temperature of materials prone to soften during these operations.

Mathieson CO_2 comes in a variety of forms and quantities ranging from 50-lb. cylinders and dry ice to 24- and 30-ton tank cars for direct unloading to your process. Why not contact an Olin Mathieson representative soon for an informative discussion that may open new or more economical uses for this safe, tested product.

HERE ARE SOME OF THE IMPORTANT CHARACTERISTICS OF CO_2 VAPOR

Molecular weight	44.004
Specific Gravity	1.527 (when air equals 1) 1.557 (when N_2 equals 1)
Absolute density	0.114 lb/cu. ft. @ 70° F.
Thermal conductivity	0.590 (air equals 1)
Specific heat	0.19 to 0.21 BTU/lb
Volume, cu. ft./lb	8.79 @ 70° F.
Pressure, saturated	852.5 psia @ 70° F.
Cost, 100 cu. ft.	$0.455 ($CO_2$ costing $.04/lb)

5628

MATHIESON CHEMICALS
OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.

Check 3491 opposite last page.

Cocoa butter substitute is low cost, hard fat

Cosmetic, pharmaceutical, and food manufacturers now have available a wax-like fraction of palm kernel oil whose properties are very similar to cocoa butter — and is available at about 1/3 the cost.

Three grades are available, each with 0.2 (max) acid point and 245/250 saponification value. They are free from moisture and impurities.

PALKENA

Melting point (°F, complete)

A	W	S
90/93	95/98	97/100

Iodine Value

A	W	S
6.5/8.5	4/6.5	1 max

(Palkenas are made be Fuji Oil Co., Ltd., Osaka, Japan and are distributed in US by Dura Commodities Corp., 20 Vesey St., New York 7, N.Y.)

Check 3492 opposite last page.

Inhibited decyl alcohol improves ester quality, and cuts costs

Manufacturer has developed inhibited decyl alcohol that yields improved esters and may substantially reduce manufacturing costs. Alcohol is protected by addition of inhibitor during esterification process, and any appreciable color formation is prevented.

During the course of normal ester purification, additive is removed. Resulting ester retains good electrical properties.

Important economies may also be effected, in addition to improving ester quality. Decoloration of ester with carbon black, to obtain a product which has a very light color, is usually unnecessary. Inhibited alcohol is available in tank cars or 55-gal drums.

(Inhibited decyl alcohol is product of Enjay Company, Inc., 15 West 51st St., New York 19, New York.)

Check 3493 opposite last page.

Over 1000 grams per inch peel strength developed by adhesive

Binds Teflon to Teflon or to metals

Uses: For binding Teflon-to-Teflon or Teflon-to-metal and a variety of other materials.

Features: Material develops peel strength of over one thousand grams per inch, or direct pull of 12 to 15 psi for Teflon-to-Teflon, and Teflon-to-stainless steel. It has good acid and alkali resistance, and excellent electrical properties.

Description: Adhesive can be applied by brushing, dipping, or spraying. For small applications brushing is best. After applying adhesive to Teflon, it should be dried before pressing parts together.

(Flexrock #80 is available from Packing Div., Flexrock Co., 3611 Filbert St., Philadelphia 1, Pennsylvania.)

Check 3494 opposite last page.

Chlorofluorocarbon — resists oxidizing, non-flammable

Good heat-transfer qualities, electrically, non-conductor

Uses: As coolant or heat-transfer medium on industrial equipment where water is not suitable due to possible hydrolysis or reaction with oxidizing agents if leak should occur; as dielectric medium; and as chemical intermediate.

Features: Material is highly resistant to oxidizing agents, is non-flammable, and non-polar. Thermodynamically, it has good heat-transfer characteristics, and electrically, it is a non-conductor.

Description: Chlorofluorocarbon is clear, colorless liquid at room temp. Moderately toxic.

(Halocarbon 437 is available from Halocarbon Products Corp., 82 Burlews Ct. Hackensack, New Jersey.)

Check 3495 opposite last page.

YOU CAN RECOVER OVER 80% PENTANES PLUS FROM LEAN NATURAL GAS

100 pounds of Davison Silica Gel adsorbs 1.5 to 3.0 gallons of hydrocarbons at 80% recovery efficiency

Why lose valuable hydrocarbons suitable for sale as gasoline, when you can recover them so easily with Davison Silica Gel?

This desiccant has high capacity for moisture and hydrocarbons, so minimum size equipment does the job. You'll find, too, that Davison Silica Gel is readily reactivated . . . gives low dewpoints . . . resists fouling . . . gives low pressure drop . . . is hard, tough, non-dusting and non-corrosive.

Why not get the whole story? See for yourself why Davison Silica Gel is ideal for natural gas dehydration and hydrocarbon recovery. Write today for literature.

Progress Through Chemistry

DAVISON CHEMICAL COMPANY

Division of W. R. Grace & Co.

Baltimore 3, Maryland

Check 3496 opposite last page.

Announcing

the New Jerguson

MAGNETIC GAGE

For Liquid Levels

An important advancement in liquid level observation for plants with dangerous explosive or inflammable conditions.

- Safety design seals against escaping gases.
- Measuring mechanism in stainless steel chamber.
- Scale mounted outside chamber; magnetically actuated through chamber wall.
- Distinct, accurate level shown in red contrasted with silver above.
- Job designed, correlating pressure, temperature, and specific gravity.
- For pressures up to 2500 lbs. @ 600° F.
- Can also be used for interface.

Patent Applied For

Write for folder on Jerguson Magnetic Gages.

Gages and Valves for the Observation of Liquids and Levels

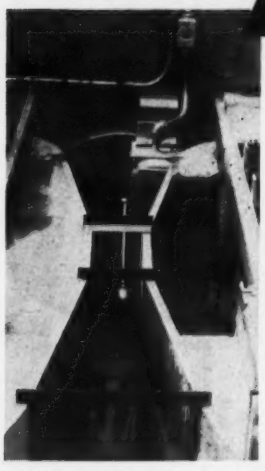
JERGUSON

JERGUSON GAGE & VALVE COMPANY
100 Adams Street, Burlington, Mass.
Offices in Major Cities. In Canada: Peacock Bros. Ltd.

Check 3497 opposite last page.

- **Save Initial Costs**
- **Eliminate Costly Maintenance**

thru this NEW CONCEPT in MEASURING FLOW thru PARSHALL FLUMES



with a

BURGESS-MANNING TYPE "ML" METER INSTALLATION

You completely eliminate such installation costs as: excavation for dry well; concrete dry well foundation and walls; metal float well and cover; connecting telltale piping, valves and fittings between Parshall Flume and float well; float cable and protecting piping; clear water piping and fittings for back-purge system, and metal grating to cover dry well.

And, most important, the only maintenance you will have is the possible hosing off, in a few seconds, of the float once in many weeks. Receiver may be located up to 5000 feet from transmitter.

Write for Burgess-Manning "ML" Meter Bulletin.

Think of the savings! Think of the elimination of maintenance!

BURGESS-MANNING COMPANY
Penn Instruments Division
4126 Haverford Ave., Philadelphia 4, Pennsylvania

Check 3498 opposite last page.

Save dollars, gain quality with aromatic diamine

Has relatively no toxicity

Uses: With melamine resins, particularly in alkyd formulations for industrial finishes.

Features: Availability of aromatic diamine in pure chemical form enables resin formulator to save money, formulate specific resins, improve quality through use of this relatively non-toxic and non-irritating material.

Description: In this solid, reactive, aromatic diamine, a phenyl group has been substituted for one of the amino groups of melamine. As such, it undergoes reactions of melamine, and is reactor with alcohols and aldehydes to form wide variety of useful resins, made with same equipment and techniques as are used with melamine.

(Benzoguanamine and Benzonitrile are available from Tennessee Products & Chemical Corp., First American National Bank Bldg., Nashville 3, Tenn.)

Check 3499 opposite last page.

Agent boosts wetability, detergency

Uses: As additive for caustic bottle-washing solutions for bottlers, brewers.

Features: Additive increases wetability and detergency of soaker solutions without foaming; cleans and de-rusts tanks and chains; dissolves and suspends scale; promotes pulping of paper labels; reduces caustic dragout; prevents smut and scale, and eliminates hand brushing and acid cleaning.

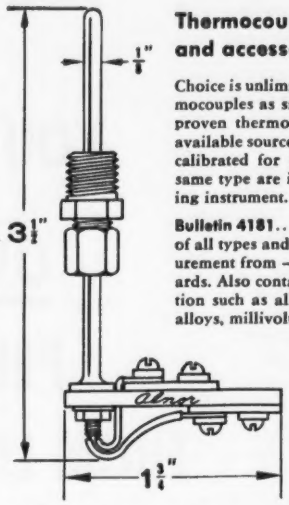
Description: Additive is an organic sequestering agent with built-in wetting, dispersing, and rust solvent properties. It is inexpensive because it is used at low concentrations with plain flake or liquid caustic.

(Extend-R is product of United Chemical Corp. of New England, 45 Seekonk St., Providence 6, R. I.)

Check 3500 opposite last page.

Alnor®

pyrometer supplies



Thermocouples, alloy wire, and accessories

Choice is unlimited at Alnor, where you'll find thermocouples as small as ⅛" O.D. and more unique, proven thermocouple designs than at any other available source. Each thermocouple is individually calibrated for its specific application—all of the same type are interchangeable without recalibrating instrument.

Bulletin 4181... lists thermocouples and accessories of all types and alloys for every temperature measurement from —100° F. to 3000° F., to ISA Standards. Also contains complete engineering information such as alloy curves, uses and limitations of alloys, millivolt relationship tables, etc.

Bulletin 4257... lists *surface* temperature thermocouples and accessories available from Alnor.

Circle bulletin number you want, attach this ad to your letterhead and mail to: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.

Model 3480 small pipeline thermocouple. Precision built to Alnor performance standards. Unit price: $9.00.

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

Alnor

Check 3501 opposite last page.

need more information . . .

Note there is a key number at the end of editorial articles or advertisements. To request more information check the proper number on the convenient form opposite the last page. Send the form to us . . . we do the rest. Information comes direct to you. No obligation, of course.

Neopentyl glycol imparts unusual stability to derivatives

Uses: In polymer plasticizers, polyurethane foams, unsaturated polyester resins, monoesters, and as modifier of alkyd resins.

Features: Presence of two methyl groups on beta or central carbon atom of neopentyl glycol gives the molecule unusual stability which appears to be imparted to derivatives of the diol. Polyesters made from neopentyl glycol exhibit superior thermal, hydrolytic, and ultraviolet stability and also possess good electrical properties.

Description: Neopentyl glycol is a white, flaked solid. It is manufactured by the aldol condensation of one mole of isobutyraldehyde with one mole of formaldehyde, followed by hydrogenation. Material melts at 120-130°C.

(Neopentyl glycol is available in commercial quantities from Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Co., Kingsport, Tenn.)

Check 3502 opposite last page.

Isocinchomeronic acid — ring-nitrogen ups dye receptivity

Non-acidic impurities are < 5%

Uses: As intermediate in preparation of pharmaceuticals, insecticides, polymers, and dyestuffs.

Features: Ring-nitrogen offers possible increased dye receptivity in polymer applications. It has no free water, less than 1% isocinchomeronic acid monohydrate, and its non-acidic impurities are less than 5%.

Description: Isocinchomeronic acid, a light tan to yellow powder, has an mw of 167. It melts with decomposition at 236°C. Tentative specs call for 95% purity.

(Isocinchomeronic acid is available from Ansul Chemical Co., Marinette, Wisconsin.)

Check 3503 opposite last page.

BRIEFS for buyers of

Muriatic Acid
Sodium Benzoate
Caustic Soda

Is the wrong kind of muriatic giving your process indigestion?

Just look at some of the things that can happen when the muriatic acid you buy isn't quite as good as it should be for your process.

If you're making benzidine dyes, for example, you know that *sulfates* in muriatic acid can gum up your equipment with an insoluble white precipitate.

In refining certain high-grade metals, such as radium, sulfates can cause serious extraction losses. Sulfates are bad actors, too, in processing many food and vitamin products.

Iron, another impurity sometimes present in muriatic acid, can make a product that should be white come out yellow.

Arsenic, present in some acids, can cause trouble, too—including formation of toxic arsine gas during metal pickling.

Finally, *free chlorine* in muriatic can give your production men headaches by helping to oxidize valuable components in the batch.

What to do about it This brings us to the reasons why *your* process, if it's sensitive to any of the impurities mentioned above, will perk most efficiently when you feed it Hooker White muriatic.

Hooker White is just about the purest muriatic acid you can buy in commercial volume.

It contains a mere 0.0001% iron as maximum; only 0.003% sulfates; *no* free chlorine; *no* arsenic.

If your processing requirements are only slightly less rigid than these, you'll want to get acquainted with another member of the family: Hooker Commercial Grade muriatic. This grade contains only 0.0005% iron; 0.003% sulfates; a trace of free chlorine; no arsenic.

You can get either grade in 13-gallon carboys or in rubber-lined tank cars, in three strengths: 18°, 20°, 22° Baumé. For technical data, check the coupon. If you'd like samples of either grade, please drop us a line on your business letterhead.

Sodium benzoate learns new tricks

One of the newer uses of sodium benzoate is in preservative wrappings and containers that improve the keeping qualities of food and other perishable products.

This old stand-by is exciting new interest also as a corrosion inhibitor where certain liquids are "packaged" in metal. Examples: the cooling system in your car; a can of paint.

Whether you're pioneering one of these interesting new uses, or putting sodium benzoate through one of its tried-and-true routines (such as preserving apple cider), you'll find a form and a grade at Hooker to suit your purpose.

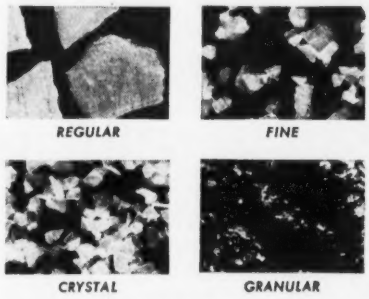
Forms You can get Hooker sodium benzoate in a *flake* that's thick enough so it won't dust—yet thin enough to dissolve speedily when you want it to.

Or you may prefer a quick-dissolving *powder* form. Hooker makes both.

Grades For food and drug products, specify our USP grade. It's 99+% pure; contains a maximum of 0.2% benzoic acid and 0.5% water.

For less exacting jobs, you still get a highly pure product in our Technical grade: 98% minimum, with only 0.4% benzoic acid at most.

For a more complete product description, check the coupon.



Especially good for repackaging

are these four sizes of Hooker flake caustic soda—all shown actual size.

Regular, *Fine*, and *Crystal* are nondusting and hold their shape. A tightly controlled flaking-screening operation makes the flakes just thick enough to stand up well and stay the same size in transit.

For data sheet, check the coupon. For samples, just tell us the sizes you want.

For more information on chemicals mentioned on this page, check here:

☐ Muriatic Acid ☐ Caustic Soda
☐ Sodium Benzoate ☐ New list of products—Bulletin 100-A

Clip and mail to us with your name, title, and company address. *(When requesting samples, please use business letterhead.)*

HOOKER ELECTROCHEMICAL COMPANY
502 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

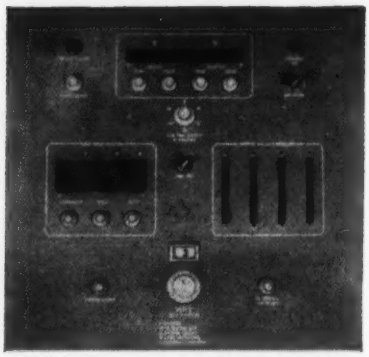
Niagara Falls Tacoma Montague, Mich. New York Chicago
Los Angeles Philadelphia Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

HOOKER CHEMICALS PLASTICS

Check 3504 opposite last page.

Kybernetes data handling equipment proven 99.7% reliable by 37,851* hours of in-plant performance!

* covering the 12 installations made during the past year.



Unmatched accuracy and reliability are achieved and sustained in the Kybernetes Data Handling System by the incorporation of advanced, fully proven techniques. The Kybernetes System provides a new, all electronic concept for the acquisition of process or test information for logging, monitoring and computing. This equipment is designed for accuracies of 0.1% for all inputs, including non-linear types, over extended periods of operation.

The Kybernetes all electronic approach to data handling provides the most direct means of digitizing low level inputs. Discrete counts, proportional in number to the magnitude of the input variables, are stored in digital form ready for direct reading into the printer or display panel. Complex analog to binary encoding and subsequent binary to digital decoding are completely eliminated.

Components having marginal operating characteristics are eliminated from Kybernetes' Data Handling Equipment, which contains no servos, stepping switches or other mechanical operations.

FEATURES OF KYBERNETES DATA SYSTEMS INCLUDE:

A — Provision to record sequential or simultaneous readings of any quantity of inputs.

B — Chopper amplifier with exceptional frequency response, linearity and gain stability as well as high noise rejection and true isolation of input and output circuitry.

C — Individual, hermetically sealed plug-in relay switching providing reliable long term commutating of input signals.

D—Specially developed linearization techniques whereby the generated comparison voltage is characterized to conform exactly to the individual non-linear characteristics of the different types of variables.

E—Plug-in, hermetically sealed components to conform to Class I, Division II requirements for semi-hazardous areas and to provide for ease of maintenance and service.

ON REQUEST: Authoritative Technical Bulletin 108a fully describes latest logging, monitoring and computing equipment. Write for free copy.

KYBERNETES®

Data Handling Equipment for Industry
logging/monitoring/computing

THE KYBERNETES CORPORATION 9 East 40th Street, New York 16, N. Y. Division of Self Winding Clock Co., Inc.

Check 3505 opposite last page.

CHEMICAL MATERIALS

Epoxy molding material has good mold release, glass reinforcement

Uses: For more rapid and economic production of molded epoxy parts for electrical and chemical industries.

Features: Epoxy molding compound has excellent mold release. Therefore, mold release agents are not needed. Compound permits production of parts with superior insulating, physical, and chemical properties.

Description: Epoxy molding compound is glass-reinforced, mineral-filled material. Cure times range from three to ten minutes at 300°F, depending on thickness and size of part. Pressures used are in the 1000 psi range. Compound has excellent resistance to acids and organic solvents.

(Tybon 5621-6 is manufactured by Adhesive, Resin, and Chemical Div., American Marietta Company, 3400 13th Ave., S.W., Seattle 4, Wash.)

Check 3506 opposite last page.

Pure metallic gadolinium, dyprosium, yttrium, erbium available

The rare earth metals gadolinium, dyprosium, yttrium, and erbium are now available in commercial quantities. Full information on the rare earths and metals was given in December 1957 CHEMICAL PROCESSING, pp 38-40.

(Rare earth metals are products of Rare Earth & Thorium Div., Michigan Chemical Corp., St. Louis, Mich.)

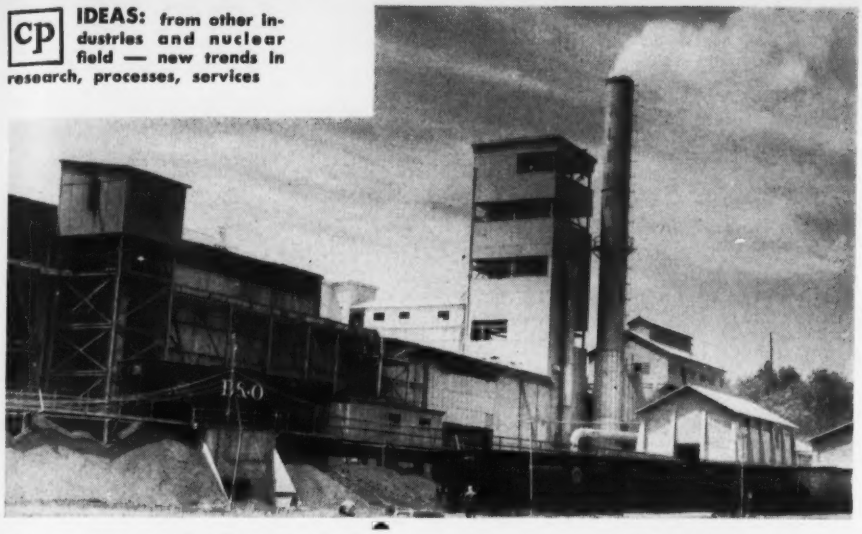
Check 3507 opposite last page.

Fluorescent pigment data

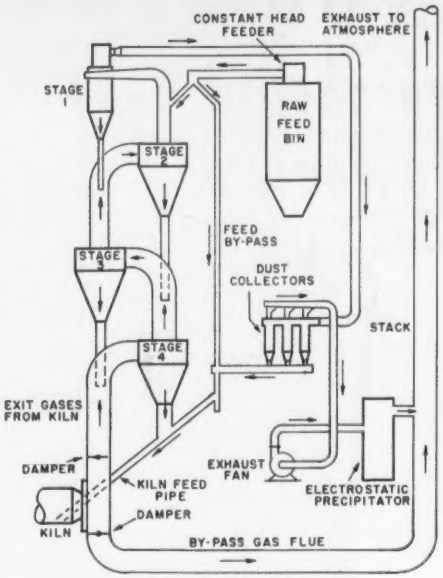
Complete data on daylight fluorescent pigments, pigment media, sample formulas, and other information is contained in 14-page bulletin. Tech bul 1115 — Switzer Brothers, Inc., 4732 St. Clair Ave., Cleveland 3, Ohio.

Check 3508 opposite last page.

CP IDEAS: from other industries and nuclear field — new trends in research, processes, services



Preheater (structure left of stack) at Alpha Portland Cement Company permits company's 10' x 120' kiln to turn out over 2000 bbl clinker per day with fuel consumption of less than 60 lb coal per bbl



Preheater has four stages. Exit gases from kiln are drawn through cyclone collectors to heat raw material in suspension as it travels to kiln feed pipe, as shown in simplified drawing

Use of European-developed suspension-type preheater is rapidly gaining in popularity in US cement plants. Several commercial units have gone into operation in the past few years. Using kiln exit gases, unit preheats raw materials prior to their entry into the kiln and . . .

Cuts kiln fuel consumption 40% Boosts clinker output 50%

Increased fuel economy and greater kiln throughput are being realized in US cement plants through the use of a suspension-type preheater. Utilizing recycled exit gases from the kiln, the unit heats the dry, pulverized, suspended-in-gas, cement raw materials before they enter the kiln. Result is that fuel consumption in the kiln is cut by as much as 40%. Clinker production goes up about 50%.

The preheater was originally developed in Germany by Klockner-Humboldt-Deutz AG, Cologne. More than a dozen commercially-proven units are now in operation in the US. About 30 are now installed or being installed in European cement plants.

The first US unit went into operation in 1953 at the Evansville, Pa., plant of Allentown Cement Company. Feeding an 8' x 125' rotary kiln, the preheater upped production from 860 to 1500 bbl of clinker per day. Fuel consumption dropped from 1.1 million to 650,000 Btu per bbl.

The first rotary kiln in the US designed specifically for use with such a preheater was installed by Alpha Portland Cement Company, Cementon, N. Y., in late 1955. This was also the first installation anywhere where excess kiln gases, those not required for preheating the raw materials, are by-passed through waste heat boilers to produce steam. The company's 10' x 120' kiln is continuously turning out over 2000 bbl clinker per day with fuel consumption of less than 60 lb of 13,500 Btu coal per bbl — or less than 810,000 Btu per bbl.

Preheater Operation

The preheater, designed and manufactured in the US by Fuller Company under license from the German firm, is in reality a four-stage system. The 1800-1900°F exit gases from the kiln are drawn in through a series of cyclone collectors to preheat the suspended raw material as it travels down to the kiln feed pipe. The material is alternately collected and re-suspended for maximum contact with the hot gases through the four stages.

The unit stands only 130 ft high. A Fuller-Kinyon pump feeds the 200-mesh material into an overhead supply bin. The material is air-conveyed into the preheater system through a constant-head feeder. This operates independent of the kiln drive and its speed can be regulated from the operating floor.

System has a tight seal connection with the back end of the kiln to minimize air leakage. A group of six small dust collectors are located ahead of the 37,000 cfm exhaust fan for the system. Fan discharges the 400°F exhaust gases through a Cottrell electrostatic precipitator to the stack.

It takes the suspended raw material about 20 seconds to travel through the preheater system. Gas velocities are about 60-90 fps. Continuous oxygen readings are taken at the kiln outlet and also in the duct ahead of the preheater exhaust fan to detect any leaks that might occur in the system.

Preheater cyclones and ducts are made of ordinary black steel and lined with refractory brick. Stainless steel is used at the discharge from the fourth stage and at some of the other restrictive points because of the high temperatures encountered here. Maximum preheat temperature is about 1400°F.

Kilns rotate at speeds varying from 30 to 90 rph. Clinker quality is excellent, there being no measurable segregation of minerals either because of particle size differences or because of variations in specific gravity. Retention time in kiln is cut to about 45 minutes. Collected dust amounts to about 5% of total kiln feed.

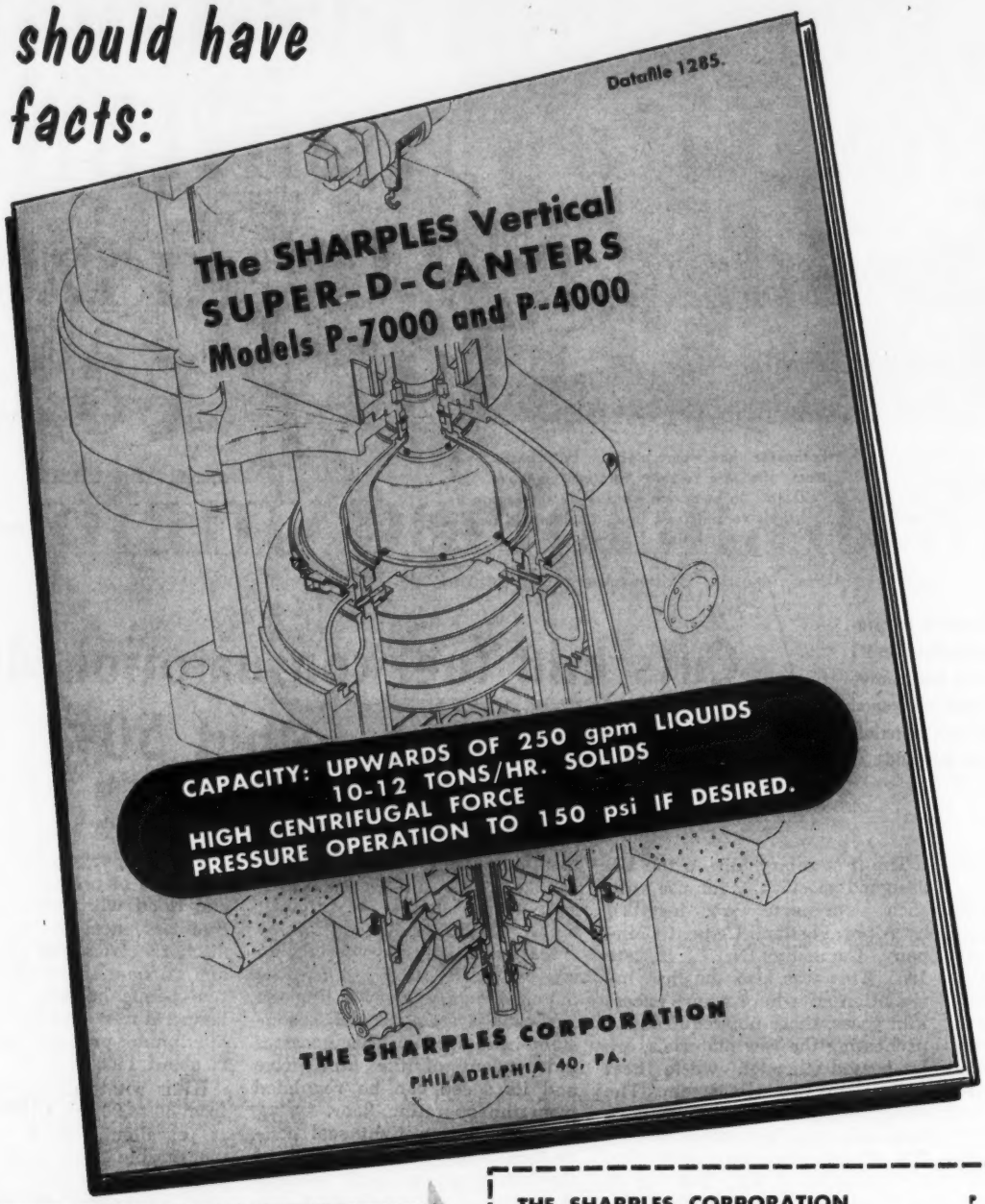
This dust is returned by screw conveyors into the kiln feed spout.

(Additional information about suspension-type preheaters can be obtained from Fuller Company, subsidiary of General American Transportation Corporation, Catasauqua, Pa.)

Check 3509 opposite last page.

IF YOU DEWATER SLURRIES...

You should have the facts:



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Please send me Sharples Datafile 1285.

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Title_____

Company_____

Street_____

City and State_____

Check 3510 opposite last page.

Nuclear test facility is nation's largest, most advanced

Expected to play key role in power development

The Engineering Test Reactor, ETR, the nation's largest and most advanced nuclear test facility, has recently been placed in operation at the National Reactor Testing Station in Idaho. Reactor provides largest known test spaces within an enriched uranium core where scientists and engineers can determine the effects of neutron and gamma ray bombardment on material components.

The $14 million reactor is expected to play a key role in the development of economic nuclear power. It required 23 months to construct.

The ETR's neutron flux average of 1.9 million billion neutrons per sq cm per sec is the highest known in a test reactor. Test spaces measure up to 9 x 9 x 36".

Light-water Core

Heart of reactor is a light-water cooled and moderated core, fueled with enriched uranium and having thermal rating of 175,000 kw. The active core is 36" high by 30" square, and is designed to accommodate experimental facilities vertical and parallel to the fuel assemblies.

The ETR was built to meet demands for testing facilities which exceeded capacity of the Materials Testing Reactor, also located at the National Reactor Testing Station. Larger experimental spaces were required to test whole fuel elements, fuel assemblies, and engineered components.

(Engineering test reactor is operated for AEC by Atomic Energy Division of Phillips Petroleum Company.)

For more information on product at right, specify 3511 . . . see information request blank opposite last page.

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ALOYCO 111 Gate Valve for 150 lb. service features double disc ball-and-socket wedges. They are free to rotate and are non-fouling in any position which insures tight closure. There are Aloyco valves and alloys designed for every type of corrosive service.

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1ST IN CORROSIVE SERVICE

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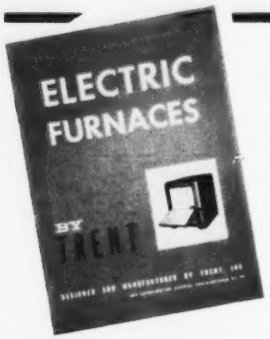
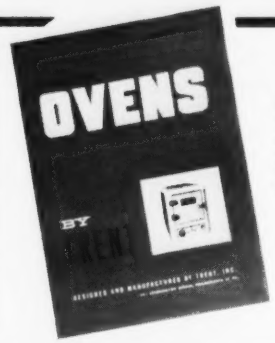
Trent exposed ribbon type resistor heating elements have proven their advantages wherever high-temperature, controlled radiant heat is essential for efficient, low cost process operations of every type. The Trent "Folded-and-Formed" heating element is the heart of Trent Custom-Built Equipment and Heating Units . . . to assure a greater radiating surface per square inch of cross-section than any other type of electrical heating element!



Annealing and Tempering Furnaces
Conveyor Furnaces
Air Draw Applications
Pot and Trough Type
Muffle Type Furnaces for the Lab

Positive Heat Control for Required Temperatures up to 2300° F. Write for Bulletin 75-TC for details on design and construction features.

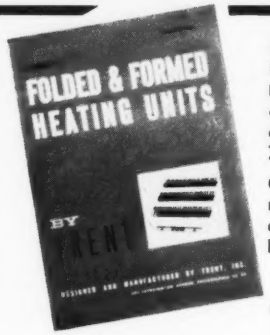


Constant Temperature Ovens
Gravity or Forced Convection
Vertical and Horizontal Air Circulation
Special Laboratory Ovens

Longer life and faster control response for every application. Write for Bulletin 71-TF for detailed data.

Only Trent "High-Temperature" Kettles and Jackets provide Positive Temperature Control up to 2000° F. No Pressure Equipment • No Over-Heat • Heat Zone Control • All-Welded Internal Connections for Maximum Life.

Write for Bulletin 72-TE for details on the complete line of available types and custom-designed installations.



Standard Racks, 12″ x 12″, for installation vertically or horizontally, side-by-side, end-to-end, or in banks to provide controlled temperatures from 750° F. to 1700° F.

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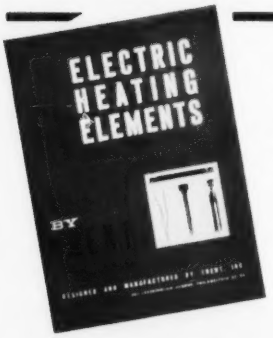
The proven heat source, readily installed in your existing equipment. Write for Bulletin 101T for detailed data on wide applications.



Strip and Cartridge Heaters
Oil and Water Immersion Heaters
Trent "Packaged" Circulation Heaters

A range of types and sizes to meet every wattage requirement and voltage condition. Write for Bulletin 74-TD.

TRENT ENGINEERING SERVICE

Trent industrial heating engineers are prepared to study your heating requirements and recommend the Trent installation to solve your heating problems. Engineering services are available through Trent representatives located in principal industrial centers in United States and Canada.

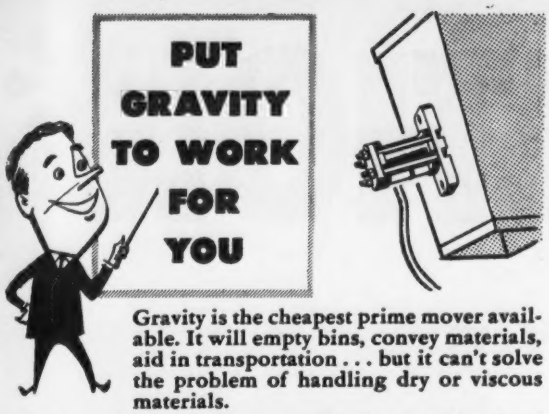
TRENT INC

Electrically Heated Industrial Equipment

235 LEVERINGTON AVE., PHILA. 27, PA.

In Canada Supreme Power Supplies Limited, Toronto 14

Check 3512 opposite last page.



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It takes the engineered application of Cleveland Vibrators to break up the frictional forces which cause adhesion and jamming. Vibration keeps materials moving in a full and controlled flow.

Cleveland Vibrators can be installed on all types of equipment for handling and processing chemicals. We will be happy to give you detailed data for your specific application, or a catalog for your reference files.

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Check 3514 opposite last page.

Low grade pegmatitic uranium ore upgraded by flotation

Recent studies performed at the University of Saskatchewan, Saskatoon, Sask., indicate that low grade pegmatitic uranium ores from the Charlebois Lake district of Northern Saskatchewan, Canada, can be successfully beneficiated by flotation.

Laboratory tests showed that the ore can be upgraded by a factor of 3.8 to 5.1 with U_3O_8 recoveries varying from 75 to 85 percent.

The ore contains 0.05-0.08 percent U_3O_8 in the form of uraninite.

A Fagergren laboratory flotation machine equipped with a 600-gm capacity glass flotation chamber was used. The most satisfactory combination of reagents consisted of sodium hexametaphosphate as a conditioner, sodium myristate or palmitate as collector, and oleic acid as frother.

(Condensed from paper prepared by A. B. Van Cleave, L. W. Crawford, and Brad Gunn, University of Saskatchewan, Saskatoon, Sask.; and S. D. Cavers, University of British Columbia, Vancouver, B. C.)

Use steam jet syphon to clean out penstock, clear parking lot

Simple device saves company time, dollars

Use of a steam jet syphon to remove water and sludge from a penstock is paying off in a double dividend at Gillete Safety Razor Company. In addition to making the cleaning job much more efficient and far less costly, the company uses the same apparatus to clear snow from its parking lots.

The 5" steam jet syphon is mounted permanently in a horizontal position close to bottom of the penstock.

Steam introduced at inlet nozzle at 175 psi entrains the sludge and water and dis-

To page 126

LIGHT
BUT SO STRONG!

~~TOTELINE~~ FIBERGLASS TRAYS

For Drying:
CHEMICALS
PHARMACEUTICALS
ANTIBIOTICS

They're feather-light, but they're durable and sturdy as any trays you've ever used! What's more, the large inside corner radii makes them very easy to clean. And, because fiberglass does not absorb heat, the materials dry faster in Toteline trays. Many sizes available. Write

TOTELINE Wherever materials are handled

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FIRST WITH A COMPLETE LINE OF SAFETY SWITCHES

TO MEET THE
New NEMA Standards
TYPES HD, ND, LD
at no cost premium

Write for New NEMA Standards Bulletin
Address Square D Company, 6060 Rivard St., Detroit 11, Mich.

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE

SQUARE D COMPANY

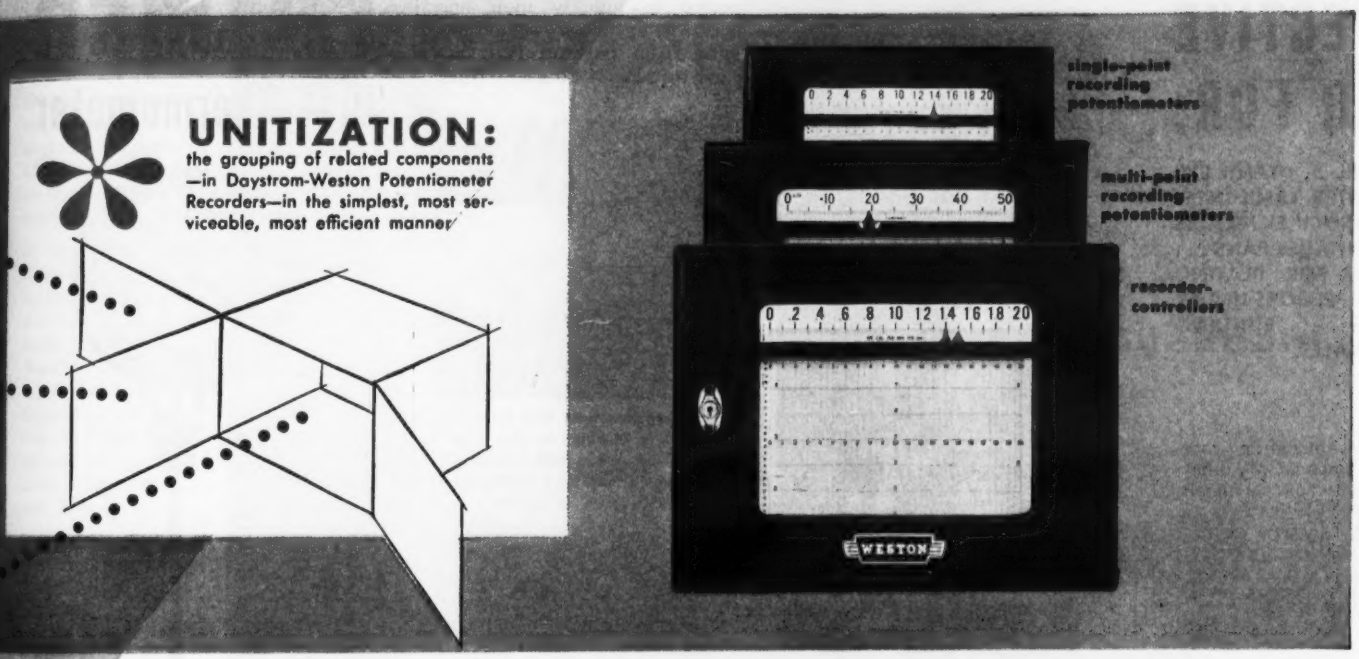
Check 3516 opposite last page.

UNITIZATION*

INSIDE the Single-Point Recorder . . . note how UNITIZED design integrates the main functions into accessible units . . . chart mechanism . . . recording-indicating system . . . measuring-balancing system. Look at the clean simplicity of each frame. No jungle of wiring; no exposed solder connections; complete separate housings for key parts.

A DAYSTROM UNIT

pays off BIG!


UNITIZATION:
the grouping of related components —in Daystrom-Weston Potentiometer Recorders—in the simplest, most serviceable, most efficient manner
single-point recording potentiometers
multi-point recording potentiometers
recorder-controllers
WESTON

GREATER DEPENDABILITY . . . LOWER MAINTENANCE . . . EASIER SERVICING
stem from WESTON's exclusive UNITIZED instrument design!

Trouble-free instrument service begins with design. Weston's unitized design—unequalled for simplicity—makes possible longer, more accurate performance . . . eliminates on-the-line headaches and inconveniences.

• **HIGHEST RESOLUTION** is made possible by use of 2500-turn universal slidewire. No competitive instrument offers a comparable slidewire.

• **GREATEST TIME SAVINGS** in routine servicing: Charts are installed in seconds; pen is filled without removal, and restarts instantly.

• **LOWEST SPARE-PARTS INVENTORY:** Amplifier uses standard tubes; matching is unnecessary. A single amplifier serves all speeds and sensitivities. Slidewires, range standards and alarm components are interchangeable.

• **SIMPLEST MAINTENANCE:** All inspection and servicing is done from the front of the instrument. Entire amplifier can be quickly removed for servicing without breaking any soldered connections.

• **COMPACTNESS:** These are the smallest case, standard chart size potentiometer instruments offering guaranteed ¼% accuracy. Less panel space is required. Instruments mount in standard radio or relay racks.

• **VERSATILITY:** Range standards are instantly changed on exclusive range panel. Chart speeds are changed with a simple screwdriver adjustment. Instruments easily adapt to special equipment, such as alarm circuits.

• **RESISTANCE TO SHOCK,** vibration, corrosive atmospheres: Key components have complete separate enclosures, yet are readily accessible. Shock tests prove instruments practically immune to mechanical damage.

For more complete information, call your local Weston Representative, or write . . . WESTON INSTRUMENTS, Division of Daystrom, Inc., Newark 12, N. J.

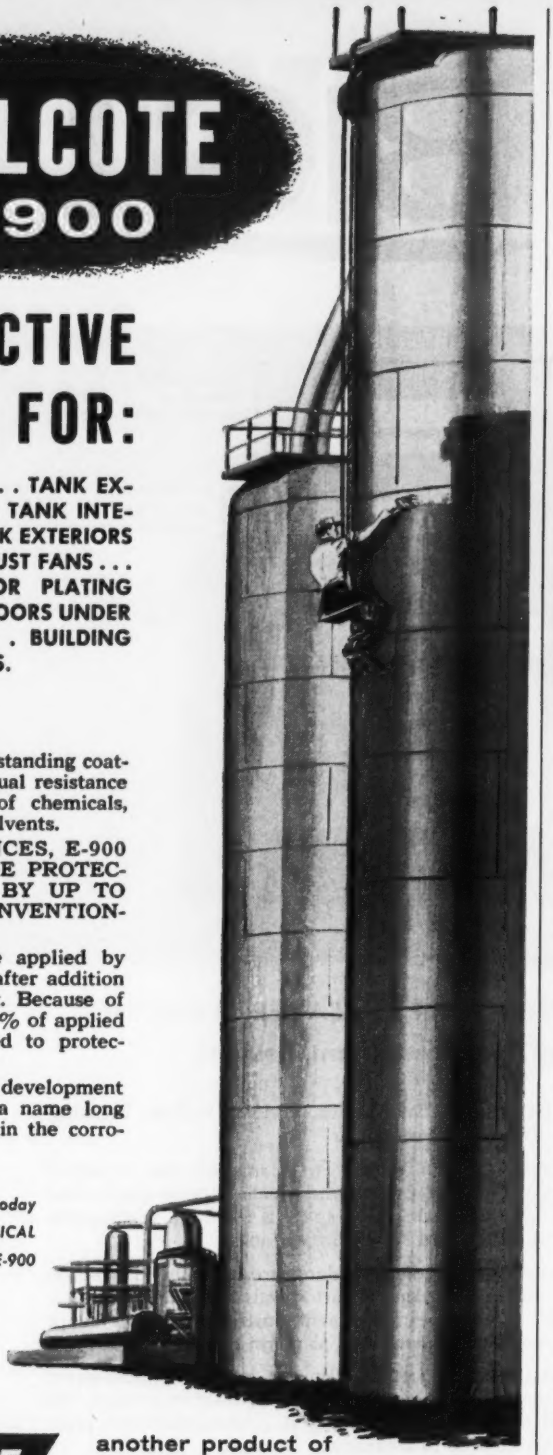
DAYSTROM-WESTON
Industrial Instruments

Check 3517 opposite last page.

CEILCOTE E-900

...PROTECTIVE COATING FOR:

STRUCTURAL STEEL . . . TANK EXTERIORS . . . WATER TANK INTERIORS . . . TANK TRUCK EXTERIORS . . . STACKS . . . EXHAUST FANS . . . CONCRETE PIERS FOR PLATING FOUNDATIONS . . . FLOORS UNDER STORAGE TANKS . . . BUILDING WALLS . . . PIT WALLS.

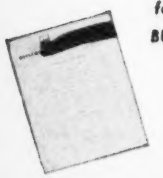


E-900 is truly an outstanding coating. It provides unusual resistance to a wide variety of chemicals, acids, alkalies and solvents.

IN MOST INSTANCES, E-900 OFFERS THE SAME PROTECTION AFFORDED BY UP TO TEN COATS OF CONVENTIONAL PAINTS.

New coating can be applied by brush or roller coat after addition of a hardening agent. Because of high solid content, 95% of applied thickness is converted to protective film.

E-900 is an exclusive development of CEILCOTE . . . a name long recognized as leader in the corrosion industry.



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7821-CC

Check 3518 opposite last page.

IDEAS

From page 123

charges the waste material through a pipe into nearby tidal bay.

With discharge-to-bay line valve closed, and by-pass discharge line valve opened, as much as 500′ of 3″ fire hose with fire nozzle can be connected to quickly melt and wash away snow accumulations from parking lots that used to take 24 hours of work

Snow accumulations that used to take up to 24 hours to clear with a machine, are quickly removed by means of fire hose hooked up to 5" steam jet syphon

with a machine to clear.

Prior to installing the jet apparatus, penstock silt removal was always an unhappy compromise between factors of cost and frequency. Now it costs only about $120, including steam and labor, to clean the penstock annually. Syphon installation was approximately $500.

(Steam jet syphons are product of Schutte and Koerting Company, Cornwell Heights, Bucks County, Pa.)

Check 3519 opposite last page.

Pipe — nuclear uses

Bulletin of four pages contains information for engineers and equipment fabricators on stainless steel and special-purpose alloy tube and pipe available for use in nuclear energy applications. Listing of 34 different analyses which can be supplied for use in equipment for atomic field is contained. Bul TD 123—Alloy Tube Div., The Carpenter Steel Co., Union, New Jersey.

Check 3520 opposite last page.

Outstanding Accuracy PALMER Dial Thermometer

Check these functional features

- Direct-drive Bourdon Coil with a filled system for longer lasting accuracy.
- Stem can be placed at any desired angle and case can be rotated to most readable position.
- External calibration for zero setting.
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Check 3521 opposite last page.

PETROCHEMICALS SECTION

—starts on page 87 in this month's CHEMICAL PROCESSING and is carrying news on the booming worldwide petrochemical industry.

Designed for Management

Section has been especially designed to meet the needs of petrochemical management.

It analyzes the meaning of petrochemical developments here and abroad. Engineering-type articles telling how costs can be cut, labor saved, or products improved are included.

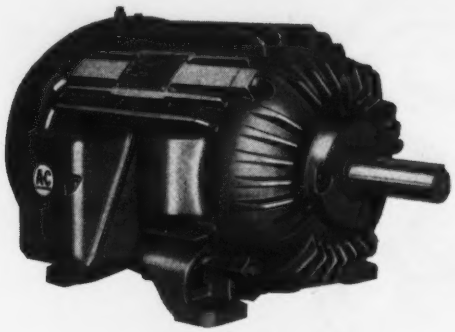
Information on petrochemical processes are featured.

Reports study on petrochemicals

This month, the section leads off with results of a study CHEMICAL PROCESSING made in cooperation with a number of petrochemical leaders.

Report indicates petrochemical industry will top growth rate for either petroleum refining or chemical industry.

For more information on product at right, specify 3522 see information request blank opposite last page.



long-run power by Allis-Chalmers

If you specify
"Allis-Chalmers motors or equal"

. . . remember that the "equal" is possible only in two respects: price and nameplate specifications. You can't match the *long-run power* of Allis-Chalmers motors.

Double-shielded bearings guarded against dirt and overgreasing . . . provision for elimination of moisture condensation . . . practically indestructible rotor design . . . more cooling surface . . . more iron and copper content — these are the features (with others) that make up long-run power. These are the features that give Allis-Chalmers motors "plus" performance that can't be equalled.

Find out more about the motors with long-run power from your A-C representative or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

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have proved their efficiency and versatility in countless applications. For example:

1 OUNCE KILLS FOAM IN . . .

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- **125,000 lb** phenolformaldehyde, urea formaldehyde, asphalt, starch sizing
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Just a few drops of a Dow Corning SILICONE DEFOAMER can prevent mountains of foam . . . enabling you to utilize full productive capacity and put your processing into high gear. What's more, when you control foam, you eliminate the mess and waste of boilovers. Whatever *your* foaming problem, a Dow Corning SILICONE DEFOAMER will help solve it at amazingly low cost.

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NAME

TITLE

COMPANY

CITY ZONE STATE

My foamer is

Oil system

Aqueous system

Food products

Other

Check 3523 opposite last page.

Information obtained from survey of 17 plants in recent study points out need for a —

Standard motor for chemical uses

In a recent study conducted by the Research Department of Putman Publishing Company, the need for standardization of motors for chemical applications was made apparent. Detailed replies to a questionnaire on electric motor usage were obtained from 17 representative plants producing organic and inorganic chemicals.

One large chemical company found the information in the research report of particular value in the work of that company's Motor Committee. It allowed this committee to compare their company practices on motors with those of other companies in the chemical industry.

The findings show that no agreement exists at present among manufacturers or users as to what constitutes a chemical motor. For example, one chemical plant having 33,000 motors reported a negligible number built specifically for corrosive atmospheres — while another chemical plant with 20,000 motors reported 90% built specifically for corrosive conditions.

Some plants order totally enclosed and explosion-proof motors with certain mechanical features for corrosive locations — such as plastic fans or special protection for insulation. Comments indicated that it would be of definite value to the chemical industry to have standardization in the chemical motor field.

The following are some of the more pertinent of the individual comments made by respondents to the story on the chemical motor:

One plant reports that "totally enclosed and explosion-proof motors have been furnished with certain mechanical features specifically provided by the motor manufacturers to meet our requirements for service in corrosive locations. These requirements include cast iron, bronze or plastic fan, and cast iron junction box.

Another plant says "our own experience is that a sealed bearing gives us less trouble on motors up to 25 hp. With greasable bearings, it is difficult to keep the motors on a lubrication schedule, to avoid overgreasing, and to keep corrosive material and dirt from getting into the bearings when relubricating."

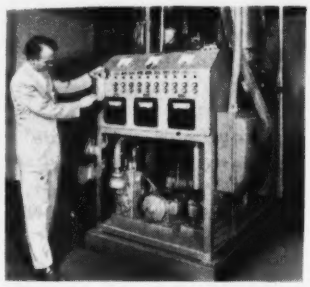
A third respondent reports "motor failures in service are about equally divided between winding failures and bearing failures. Winding failures may be divided into two classes: 1) due to the aging of insulation and its embrittlement, and 2) to the presence of moisture or faulty insulation."

Another plant reports that "the cast iron frame and end bells, in most applications, give the best service. Heavier sections extend the life of the motor and delay its retirement. Motors with fabricated structural frames or pressed steel parts usually corrode through faster, and require an earlier retirement."

(From study, "Electric Motor Usage and Buying Practices in Chemical Plants," conducted by Putman Publishing Co., 111 E. Delaware Pl., Chicago 11, Illinois.)

Pilot molecular stills offered for test runs by company

Manufacturer of high-vacuum molecular distillation equipment is offering its Model "700" pilot molecular still for test runs and limited custom distillation. The high-vacuum molecular still is capable of feed rates up to 150 lb/hr. Unit can process organic compounds with molecular weights to 1250 and silicones and halocarbons to 4000.

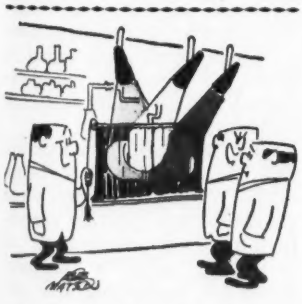


Pilot molecular stills have feed rates up to 150 lb/hr

Any operation performed on the small unit can be duplicated on large production models. Cost of pilot runs or tests of customers' material is $125.00 per day.

(Further information on high-vacuum molecular distillation equipment may be obtained from Arthur F. Smith Company, 311 Alexander St., Rochester 4, N. Y.)

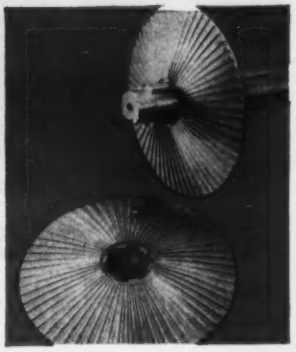
Check 3524 opposite last page.



"I wish he wouldn't always make such a big production out of his discoveries."

INSTANT SPEED CHANGING. To get desired output rpm, operator simply turns handwheel to desired position on easy-to-read dial. P.I.V. responds instantly, accurately. Drives are also available with automatic, electric, pneumatic or hydraulic controls.

SELF TOOTH-FORMING CHAIN consists of a series of steel laminations, serving as teeth, which are free to move from side to side, either singly or collectively.



RADIALLY GROOVED WHEELS have teeth cut at constant depth but of increasing width toward wheel periphery. Beveled sides of teeth provide gripping surfaces for chain.

Slipless transmission - - stepless selection

That's because LINK-BELT P.I.V. uses self-tooth-forming chain

LINK-BELT P.I.V.—unlike other variable speed drives—incorporates an exclusive metal, self-tooth-forming chain to give you instant, positive speed variation, regardless of load. This unique drive permits infinitely variable speed changes without loss of accuracy or interruption of operations. That's why P.I.V. is all industry's choice for jobs requiring stepless, slipless power transmission.

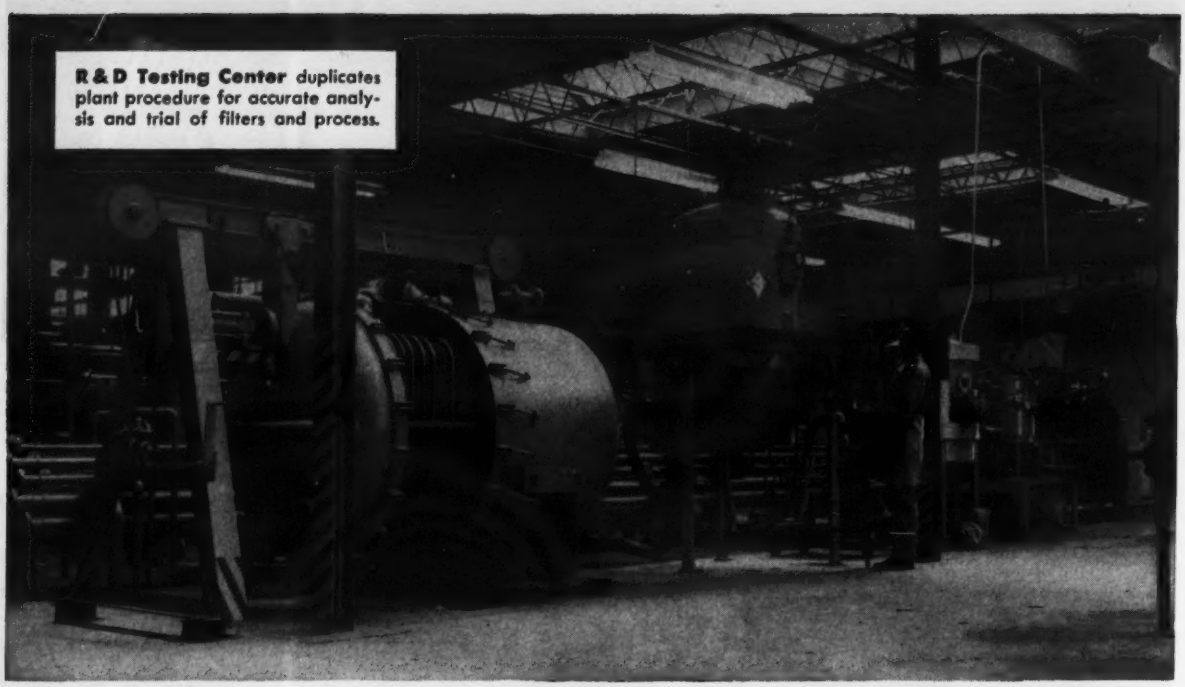
Changing speed is simple too. A turn of the control screw simultaneously varies the effective diameters of two sets of conically shaped wheels—closing one set, spreading the other. At the same time, the self tooth-forming chain automatically adjusts to provide desired ratio between the input and output shafts.

Link-Belt P.I.V. drives are fully enclosed for trouble-free operation. They're splash-lubricated for long life—unaffected by atmospheric conditions. Choose from 8 sizes in 16 standard types, with the aid of Book 2274. Call your nearby Link-Belt office or authorized stock-carrying distributor for complete information. 14.314

LINK-BELT P.I.V. VARIABLE SPEED DRIVE

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

Check 3525 opposite last page.



R & D Testing Center duplicates plant procedure for accurate analysis and trial of filters and process.

New Research Center analyzes filtration under full-scale process conditions

Industrial's Research and Development Division helps you select filters and study processes without disturbing production in your own plant.

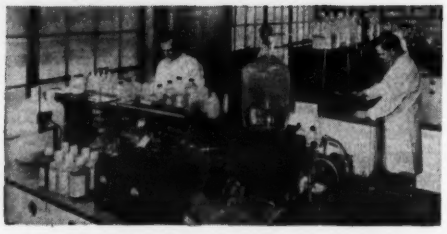
Maximum efficiency in filtration can only be gained by **examining filters and the process in actual operation.**

To do this, Industrial can place at your disposal $250,000 worth of equipment and a staff of chemists, engineers and physicists experienced in the problems of liquid-solid separation.

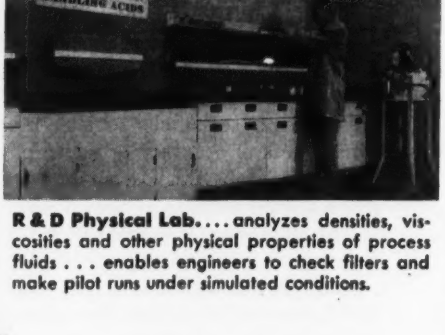
The Testing Center includes all types of pressure filters, batch and slurry tanks, heating and cooling systems, chemical addition systems, and various pumps . . . all interconnected with an ingenious valve and piping system. **Any conceivable process condition can be duplicated at Industrial.** Fluids can be routed from batch or slurry tanks to any filter to test its effectiveness, operating efficiency, and make rapid comparisons of filter types. The process itself can be studied thoroughly and **comparative data on variations is obtained in minutes** instead of days of costly experimentation in your plant.

Industrial builds filters for your processes with the same scientific approach and practical engineering skills that produced this advanced analytical center.

Talking to an Industrial field engineer will put you in touch with the most capable staff and research facilities available today. Bring your filtration problems to Industrial. We will be glad to make analyses and recommendations.



R & D Chemical Laboratory checks and maintains quality control of influent and provides precise analyses of effluent during testing and research operations.



R & D Physical Lab. . . . analyzes densities, viscosities and other physical properties of process fluids . . . enables engineers to check filters and make pilot runs under simulated conditions.

INDUSTRIAL

INDUSTRIAL FILTER & PUMP MFG. CO.
OGDEN AVENUE • CHICAGO 50, ILLINOIS

Check 3526 opposite last page.

Gamma irradiation facility

Illustrated, 54-page report contains six construction drawings and detailed descriptions for Air Force-designed high-intensity gamma irradiation facility capable of handling 100,000 curies of cobalt-60. Plans for the facility, intended for research on effects of radiation on materials, are contained in report. To obtain PB 131160, "Design of a High-Intensity Gamma Irradiation Facility," remit $1.50 direct to Office of Technical Services, United States Department of Commerce, Washington 25, D. C.

Approve new color scale for petroleum products

Jointly developed by NBS, ASTM

Advent of a new color determination scale for petroleum should take the guesswork and headaches out of the job of color-grading petroleum products. Devised by the National Bureau of Standards in cooperation with the American Society of Testing Materials, the new method has passed extensive tests and has received formal approval from the ASTM Committee on Petroleum Products and Lubricants.

In setting up the color scale, the Bureau measured the colors of 49 samples of petroleum in the pale yellow to orange range. Based on these measurements, a relocated and respaced 16-step color scale was calculated. The new scale with tolerances is specified in terms of spectral transmittances and the CIE standard observer.

Glass standards to match the color specifications are being made. When put to use, these standards will provide manufacturers and purchasers of petroleum with a uniform guide for measuring the degree of refinement of petroleum products.

Since 1923, it has been customary to measure and specify color of petroleum by

means of the ASTM Union Colorimeter. This instrument contains a series of 12 glass standards mounted in a vertical slide that may be raised or lowered to permit visual comparison of any one of the glasses with a petroleum sample placed in the colorimeter.

The original standards had three outstanding defects: 1) color scale was not defined in fundamental terms with stated tolerances; 2) glasses failed to show precisely the average colors of petroleum in various stages of refinement, particularly in lemon yellow to orange range; and 3) the 12 steps were perceptually nonuniform so that inaccuracies occurred when a sample of petroleum was compared visually with a standard nearly matching it.

(Information courtesy of National Bureau of Standards, US Department of Commerce, Washington 25, D.C.)

Need better understanding of ionizing radiation exposure effects

In view of the fact that deliberate use of atomic weapons in warfare would expose millions of people and animals to the hazards of radiation, a better understanding of effects resulting from exposure to ionizing radiation is of critical importance.

What really happens in man's body after exposure to radiation produced by atomic explosions or following X-ray treatment? According to Dr. E. L. Hess, head of the Biophysical Chemistry Section of the Rheumatic Fever Research Institute, Chicago, the thymus, a ductless gland found in the upper part of the chest cavity, is one of the body tissues most quickly affected by this ionizing radiation.

There is no satisfactory explanation as yet for the difference in sensitivity of various animal tissues to penetrating radiation such as X-rays.

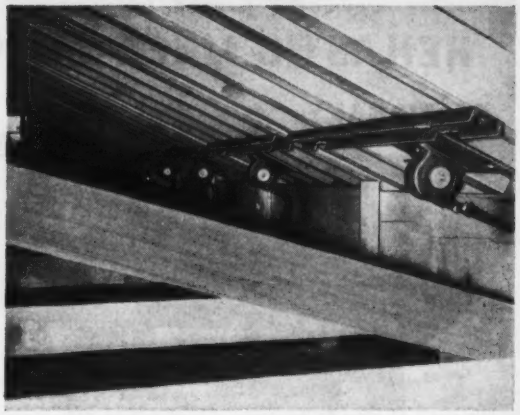
(Based on paper presented at 132nd meeting of American Chemical Society.)

Keep bulk materials MOVING!

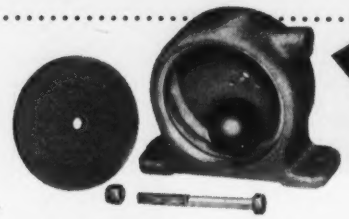
AiroViber Vibrators Combine Quiet, Efficient Materials Movement With Low-Cost, Maintenance-Free Operation!

Wherever you handle bulk material of almost any kind—load, unload, move, package, process, grade or separate it—you can keep it MOVING with AiroViber Vibrators. The simple, ball type, pneumatically-operated AiroViber Vibrator offers many advantages:

- Dependable, trouble-free operation—only one moving part.
- Starts without fail.
- Unaffected by high or low temperatures, humidity, contaminated atmosphere or air supply.
- Requires no lubrication or periodic maintenance.
- Speed controlled by air valve.
- Amplitude can be altered by changing size of ball.
- Where explosive conditions exist bronze balls may be used to reduce hazard.



Installation of AiroViber is simple, low-cost.



Steel ball (only moving part) rolls on hardened, ground track.

VIBER CO

For literature and detailed information write VIBER COMPANY, 726 South Flower Street, Burbank 46, California.

VIBRATORS

Pioneers and leaders in the manufacture of vibrators.

Check 3527 opposite last page.

Longer Wear in every pair and SAFER, too!

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FIRM GRIP

INDUSTRIAL GLOVES

- Patented embossed NON-SLIP safety grip moulded into fingers and palm.
- Curved fingers for more comfort and better fit.
- *Tough and durable . . .* last longer, look better.

Natural Rubber or Neoprene Latex

SEND FOR CATALOG No. G 3 of Seiberling's complete Industrial Glove Line!

Seiberling LATEX PRODUCTS New Bremen, Ohio

Check 3528 opposite last page.

3 BIG IMPROVEMENTS IN BIN-DICATOR® BIN LEVEL INDICATORS

1 NEW TWIST LOCK COVER

On and off in a jiffy, exposing operating mechanism, by just loosening slotted hex head screws. No nuts or bolts to fumble. Great for hard-to-reach places.

2 NEW VENTED HOUSING

No pressure build-up with flexing of diaphragm. Free action; more sensitive and reliable operation.

3 NEW DRILLED AND TAPPED FRAME FOR ASSEMBLY OF DIAPHRAGM AND RETAINER RING TO FRAME

Here also, change from nuts and bolts simplifies assembly and new diaphragm assembly with perforated mounting holes simplifies replacement or change of diaphragms.

Bin-Dicator, leading bin level indicator for over 20 years, is now better than ever. Write for catalog including data on Roto-Bin-Dicator®, flexible shaft paddle type and Bin-Flo® aerator unit which keeps bulk materials moving. All three offer real plant improvement at very low cost.

THE BIN-DICATOR CO. 13946-D Kercheval • Detroit 15, Mich.

Write for detailed literature or call VAlley 2-6952

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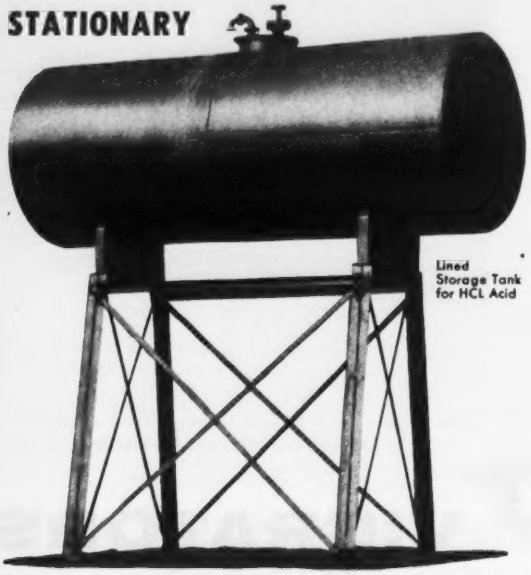
Check 3529 opposite last page.

FOR CHEMICAL STORAGE SPECIFY HEILASTIC LINED TANKS

STATIONARY



Lined Storage Tank for HCL Acid

Heil Process Equipment Chemical Storage Tanks are easily handled . . . Heilastic Lined — for use in a wide range of corrosive services — and completely fabricated to best serve your needs. Equipped for gravity or air discharge and fill, Heil Tanks provide safe storage . . . in the most widely used capacities.

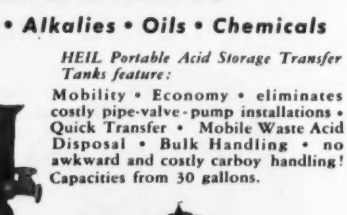
HEIL PORTO-TANKS

Transport • Acids • Alkalies • Oils • Chemicals

HEIL Portable Acid Storage Transfer Tanks feature:

Mobility • Economy • eliminates costly pipe-valve-pump installations • Quick Transfer • Mobile Waste Acid Disposal • Bulk Handling • no awkward and costly carboy handling! Capacities from 30 gallons.

60-gallon muriatic acid wagon



Rubber-lined sulphuric acid Porto-Tank with self contained pump

HEILASTIC LININGS — Rubber, Neoprene, Vinyl PVC, Plastic
METAL FABRICATION — Lead, Alloys, Steel Plate, Monel
Heil also produces: Heaters, Heat Exchangers, Exhaust Systems, Lined and Solid Plastic Fans, Fume Scrubbers, Packed Towers.

One Source — One Responsibility

CHEMICAL PROOF LININGS TANKS HEATERS PLASTICS

HEIL PROCESS EQUIPMENT CORPORATION

12901 Elmwood Avenue • Cleveland 11, Ohio

Check 3530 opposite last page.

CP **MATERIAL HANDLING**

An integral part of recent $17-million expansion program is a pneumatic conveying system by which Brown Co. . . .

gets safer, higher-speed wood chip handling

An integral part of a $17-million expansion program at Brown Co., Berlin, N.H., paper company, is a pneumatic conveying system responsible for raising plant's output.

System is conveying bulk quantities of wood chips in their Burgess mill. Two types of wood chips are being handled: 1) hard wood weighing 25 lb/cu ft; 2) soft wood weighing 17 lb/cu ft.

Chips arrive at the plant in both railroad hopper cars and trailer trucks from which they are unloaded to a screening mechanism. Discharge from screens is picked up by the air conveyor and carried to chip bin above digestor at rate of 30 cords per hour.

Conveying system is of the positive pressure type; *i.e.*, an air stream flows through conveying duct, carrying with it wood chips introduced by horizontal wood-chip feeder.

Chips are discharged through a single-stage cyclone receiver onto an existing belt conveyor which moves chips into storage bin above sulfite digestor building. Actual length of conveying duct is 170 ft.

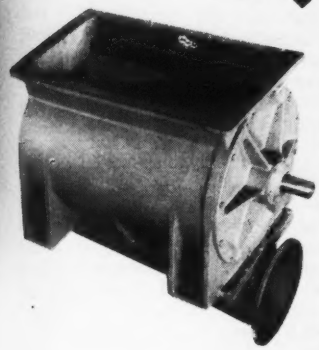
System was installed out-of-doors atop the already-built plant. Consequently, no valuable interior space was used.

Air is provided by a horizontal rotary blower equipped with an air intake silencer. Air separated in the cyclone is vented to the atmosphere.

Horizontal wood-chip feeder in this installation presents an innovation in feeder design. It is "horizontal" by virtue of the rotor drive shaft being mounted in a horizontal position. Chips are fed to

170-ft pneumatic conveyor duct (arrow) handles both hard and soft wood chips in Brown Co.'s Burgess mill. Conveying rate is 30 cords per hour

Horizontal feeder receives chips from screens and transfers them into the positive-pressure air-conveying system



the feeder by gravity and enter the conveying system through the feeder.

Feeder's body is fabricated from cast iron. Air pressure line is connected by flange coupling at the bottom of the feeder. Chips are discharged by a four-blade rotor driven at 13½ rpm by a 7½-hp gear motor.

System has proved to be cleaner, faster, and safer than former method of handling wood chips by mechanical equipment.

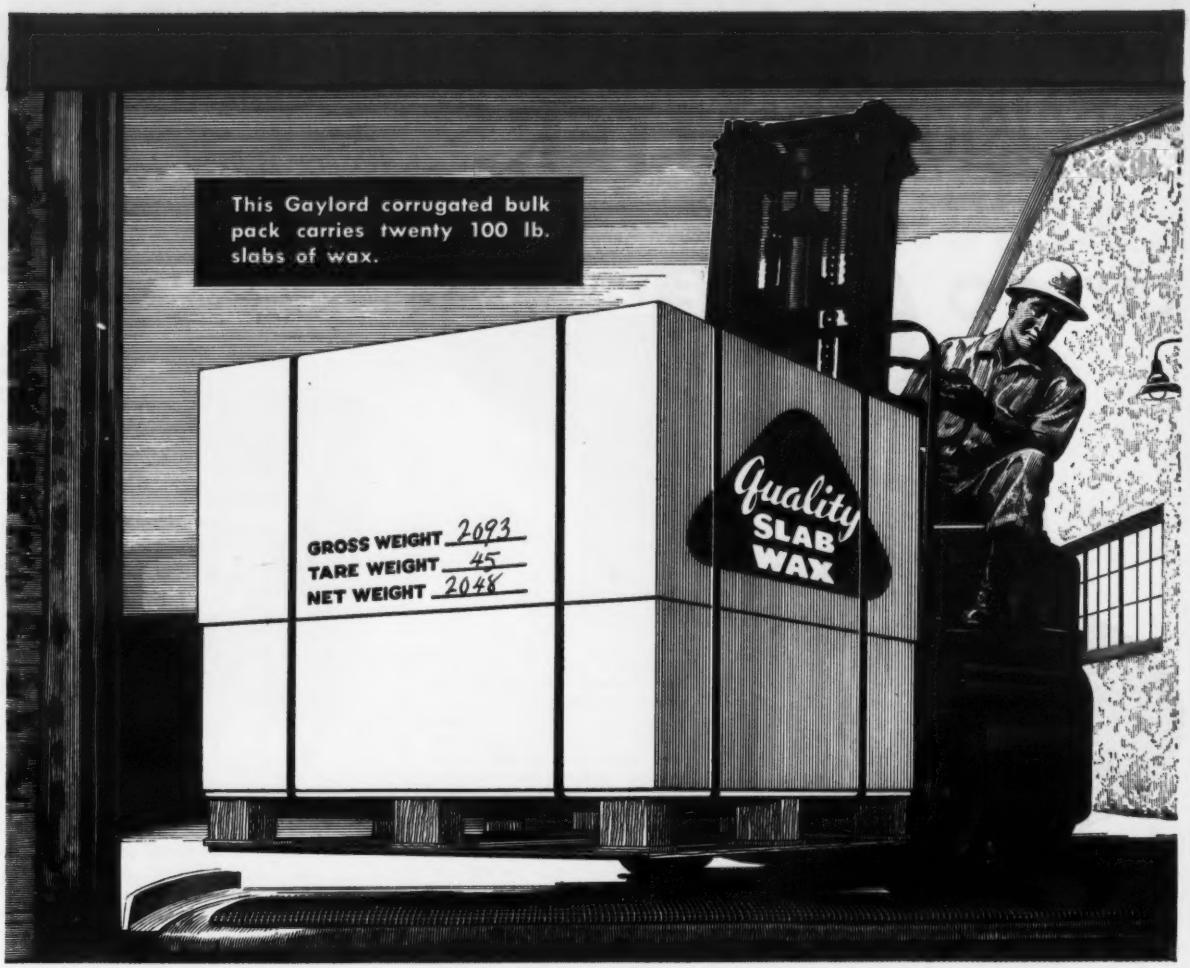
("Airveyor" pneumatic conveying system was designed, engineered, and built by Fuller Co., Catasauqua, Pa.)

Check 3531 opposite last page.

Sprockets of boron

Illustrated eight-page booklet describes manufacture of sprockets for large industrial tractors with emphasis on the role the element boron plays in creating depth of hardness. Form DE739 — Caterpillar Tractor Company, Peoria, Ill.

Check 3532 opposite last page.



BULK CONTAINERS SIMPLIFY PACKING

Gaylord Boxes

In industry after industry, Gaylord experience in bulk packing is proving itself for shippers. Whether it's for wax, plastic pellets, motors, brake linings, yarn cones or chemicals, Gaylord bulk containers simplify packing, loading, shipping... save time in every handling operation.

To learn how you can cut costs with any type of corrugated or solid fibre container, contact your nearby Gaylord office.

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

Check 3533 opposite last page.

TAYLOR-STILES PRECISION CUTTERS

CUT TO ACCURATE LENGTHS

A—Rotating element, with four fly knives. Available in 1, 2, 4 or 6 fly knives.

B—Bed knife.

C—Bed knife adjusting screw.

D—Bottom feed roll, stationary as far as up and down travel is concerned, adjustable to follow movement of bed knife.

E—Top feed roll, slides up and down against spring pressure.

F—Breaking down roll, for stock that must be compressed so feed roll (E) can grab it.

G—Feed Apron. The difference in level between the feed apron and the bottom feed roll depends on type material to be cut.

Taylor-Stiles Precision Type Cutters cut plastic and rubber sheets and rods into uniformly sized pellets. They cut continuous fibre into accurate lengths and thread waste into accurate sections. They cut many other products to precise size. The feed rolls hold the stock firmly, close to the cutting edge, while the knives are synchronized to give the exact length of cut desired.

These precision cutters are available in a whole series of light, medium and heavy duty models.

Write us today for illustrated folder No. 212. "Taylor-Stiles Precision Type Cutters" for the full story, mentioning also the type of material you must cut.

TAYLOR, STILES & CO.

20 Bridge Street

Riegelsville, N. J.

MAIL COUPON TODAY FOR FREE FOLDER.

Taylor, Stiles & Co.
20 Bridge Street
Riegelsville, N. J.

Gentlemen:

Send me your folder No. 212 fully describing and illustrating your Precision Type Cutters.

Type of material we want to cut .....

.....

Name ..... Company .....

Street .....

City ..... State .....

Check 3534 opposite last page.

MATERIAL HANDLING

Reverses material flow without 180° curved conveyor sections

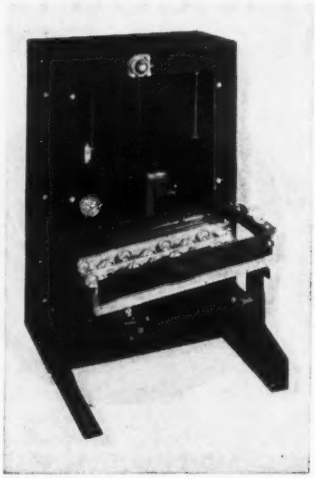
Operates in cramped areas

Uses: For changing direction of material flow on conveying system.

Features: Unit reverses the direction of flow without use of 180° curved conveyor sections. It can operate in areas where space limitations previously prevented using conveyor-turns.

Cartons coming off upper track of conveyor flow onto wheel conveyor section mounted on lift platform. Carton trips starting switch . . .

. . . and platform automatically descends to level of lower track, and tilts to start carton away from transfer unit



Description: Vertical trans-

These shipper conscious railroads have

PS-2

COVERED HOPPERS in service or on order to serve your bulk shipment needs

Atchison, Topeka & Santa Fe
Baltimore & Ohio
Bessemer & Lake Erie
Boston & Maine
Canadian National
Central of Georgia
Central Railroad of New Jersey
Chicago & North Western
Chicago, Burlington & Quincy
Chicago Great Western
Chicago, Milw., St. Paul & Pacific
Chicago, Rock Island & Pacific
Clinchfield
Delaware & Hudson
Denver & Rio Grande Western
Detroit, Toledo & Ironton
Duluth, Missabe & Iron Range
Elgin, Joliet & Eastern
Florida East Coast
Great Northern
Illinois Central
Kansas City Southern
Lehigh Valley
Lehigh & New England
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These users have discovered the benefits of PS-2 ownership!

American Sugar Refinery Co.
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PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

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fer unit accomplishes direction change by vertical lift which operates as self-supported, automatic unit. Capacities range from light to medium loads. Unit can be placed at end of two conveyor lines located in direct vertical plane, and spaced to allow clearance for materials being handled.

Cartons coming off upper track of conveyor flow onto wheel conveyor section mounted on lift platform. Carton trips starting switch as it flows onto lift, automatically starting mechanism. Platform automatically descends to level of lower track, and tilts to start carton away from transfer unit. As carton leaves platform, it trips limit switch causing lift to return to upper level. Carton flow on upper track is held back by automatic case stop, operated by lift platform.

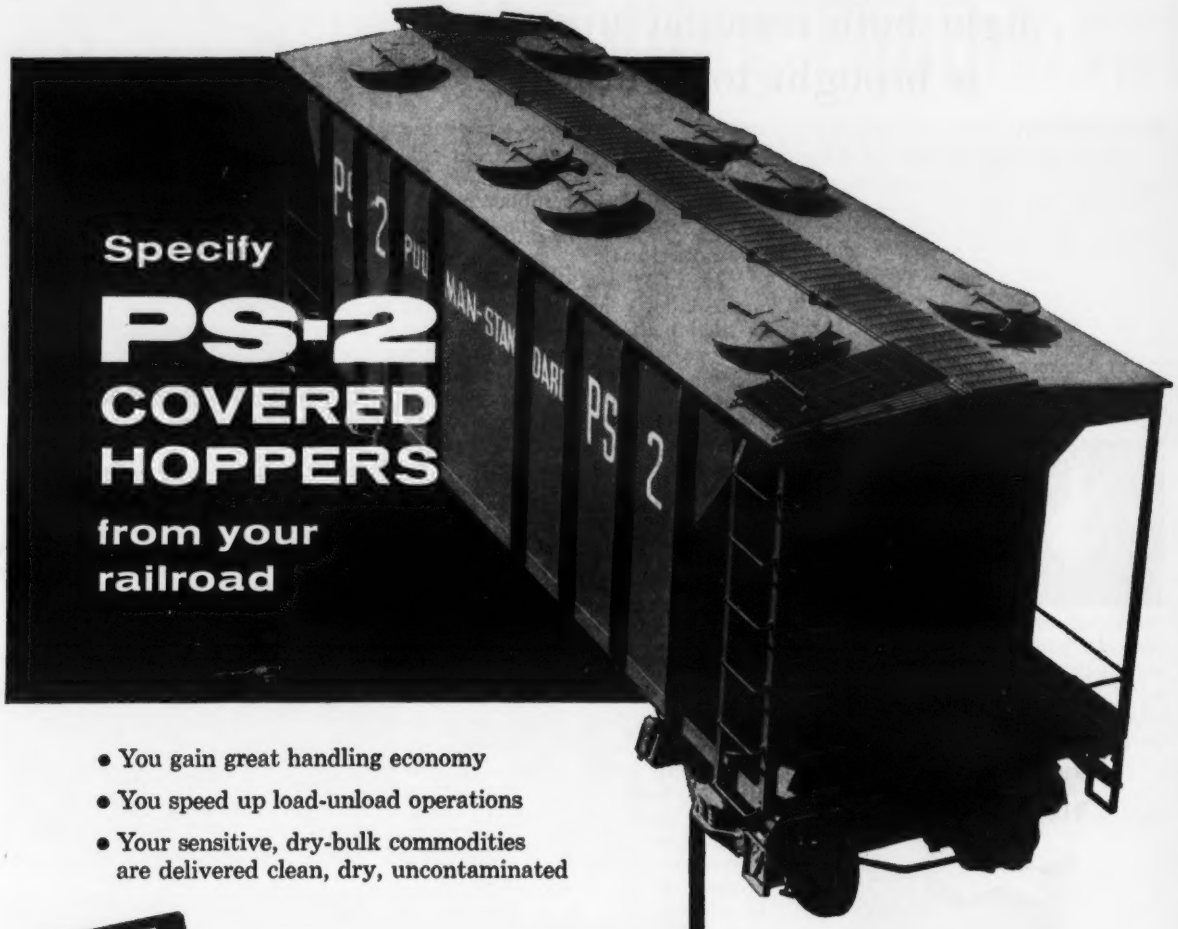
Vertical transfer unit can be used with gravity or power-driven conveyor units, in descending or ascending lines of flow. It can feed to, or from, two or more levels of conveyor track.

(Vertical transfer unit is product of the Rapids-Standard Company, Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.)

Check 3535 opposite last page.

Cartoon submitted by Tom Blakley, Florida East Coast Fertilizer Co., Homestead, Florida.

Make your bulk shipments produce even greater profits...



- You gain great handling economy
- You speed up load-unload operations
- Your sensitive, dry-bulk commodities are delivered clean, dry, uncontaminated

For complete information on the PS-2 Covered Hopper and its bulk shipping benefits, write to Pullman-Standard and ask for Booklet J-6489.

PS-2s

CAN PRODUCE THESE SHIPPING BENEFITS FOR SUCH CHEMICAL PRODUCTS AS:

Carbon Black	Lime
Catalyst Alumina	Magnesium Chloride
Crude Arsenic	Nitrates
Cyanide	Plastic Molding Powder
Ferro-magnesium	Potash
Ferro-silicon	Soda Ash
Fertilizers	
Ground Calcium	

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Check 3536 opposite last page.

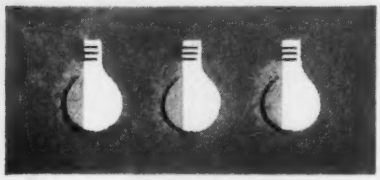
HYDRO-FILTER

Hydro-Filter Highlights of:
DUST CONTROL DOINGS

Dust Control problem of light bulb manufacturer is brought to light

The Problem:

A leading manufacturer of light bulbs wanted to build a new manufacturing line but was plagued by problems they had experienced with an existing wet scrubber. *No wonder* . . . powdered glass, broken bulbs, colored ceramic frit, alcohol and resins are used in the process and the line must operate 24 hours a day—7 days a week. A shutdown on the dust collector would mean a shutdown for the entire operation because of dust and noxious fumes. As a result, only two scrubber manufacturers would bid on the job.



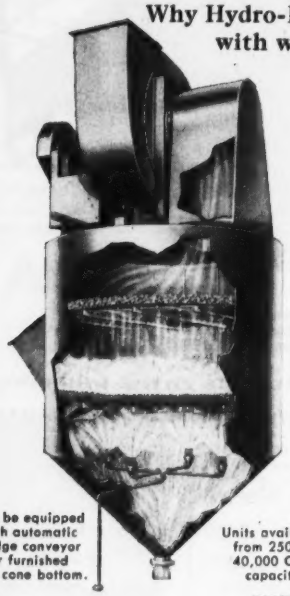
The Solution:

A type I Hydro-Filter with automatic sludge conveyor was selected for the job after customer evaluated evidence of its efficiency on the basis of (1) ability to operate at rated efficiency over prolonged periods at heavy dust load; (2) ability to operate over prolonged periods without shutdown for maintenance.

The Result:

Hydro-Filter did the job, and more. After 6 months operation the company ordered their *second* Hydro-Filter.

Why Hydro-Filter combines exceptional efficiency with welcome ease of maintenance:


Can be equipped with automatic sludge conveyor or furnished with cone bottom.
Units available from 250 to 40,000 CFM capacity

Air, water and glass spheres do the work in Hydro-Filter. There are no moving parts in the collection area. No baffles; nothing to load up and no "dead" areas to make cleaning a chore and efficiency a *myth*. The relatively simple design permits economical use of special materials of construction. It is designed to operate on dusts, sprays, fumes, and mists and can be equipped for recirculation of the liquid scrubbing medium.

Hydro-Filter will maintain a constant high level of efficiency over wide variations in volume of air and heavy dust loads. And because of its simple design, it will provide ease of maintenance *unmatched by any equipment* for similar use.

Write for descriptive bulletin today.

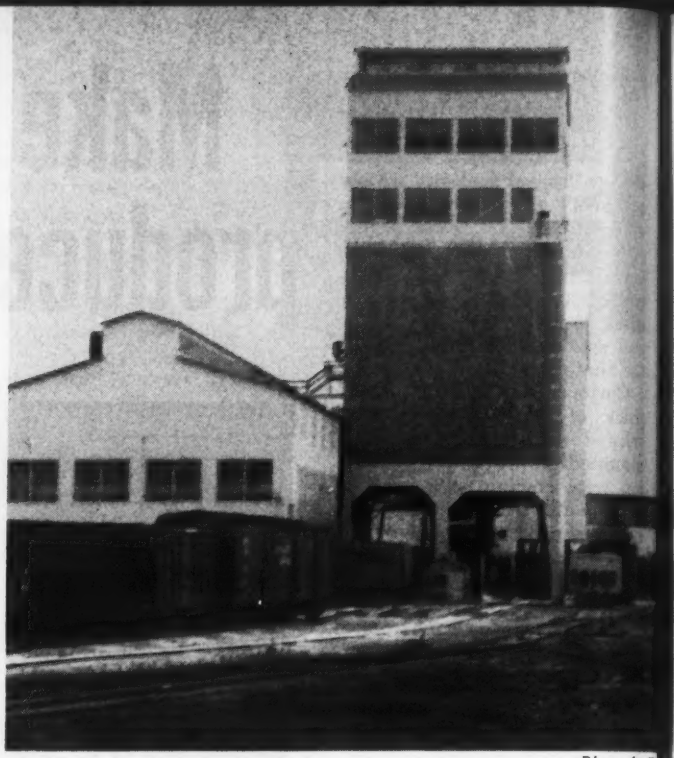
TIRED OF DUST COLLECTOR MAINTENANCE?
. . . YOU'RE READY FOR HYDRO-FILTER

HYDRO-FILTER

National Dust Collector Corporation

601 Machinery Hall Building • Chicago 6, Illinois

Check 3537 opposite last page.



Photos by O

Ottawa Silica Co. . . .

builds plant on storage

. . . to give

- **inexpensive, efficient handling and storage**
- **large capacity per minimum area**

GEORGE V. MICHAEL
Assistant Editor
With **PAUL GERDING**
Chief Engineer
Ottawa Silica Co.

In planning a new screening and storage plant, Ottawa Silica Co., Ottawa, Ill., came up with a rather unique design offering largest storage capacity per unit area plus an inexpensive and efficient way of handling and storing dry silica.

Design incorporates use of tall and narrow storage bins to reduce segregation and serve as base of screening plant. Essentially, plant consists of three floors devoted to screening operations, mounted on a group of seventeen bins. The bins straddle two railroad tracks and thus permit gravity loading into hopper or box cars. This design also affords gravity flow from screens to bins.

Sixteen of the bins measure 10 by 11 ft on the inside and are 50½ ft high. The seventeenth is a half bin used for waste material. They are constructed of 8 x 12 x 12-inch glazed tile having steel-rod reinforcing along the courses. Bins are mounted on a reinforced concrete base and stand 31 ft off the ground.

Overall building stands 135' high and measures 54' by 47'4". The three-floor screening plant is constructed of structural steel framework and corrugated metal sheeting.

Silica is carried by two-stage bucket elevator (56½-ft unit followed by 87-ft unit) to top floor scalping screens.

Tails from screen are chuted to waste bin, while

Ottawa Silica uses 17 glazed-tile bins supported over two railroad tracks. Glazed-tile construction gave necessary support plus excellent wear properties

Design of building screening plant on top of storage bins has resulted in allowing most handling and shipping operations to be handled by gravity flow

bin base

throughs are discharged, by gravity, to one of seven bins (250 ton capacity each) located over one railroad track. This material can be either loaded directly into cars or be recirculated for further screening.

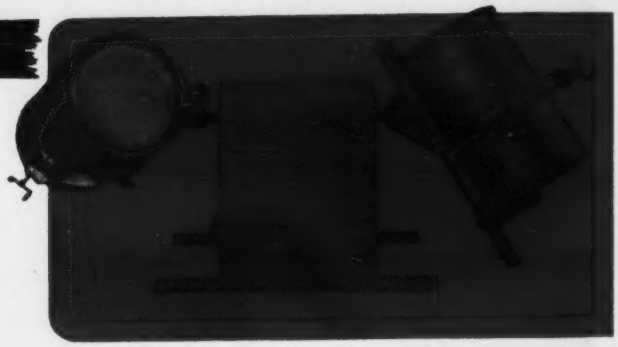
Latter is handled by a third bucket elevator which lifts material to battery of finish screens located on bottom floor of screening plant at 97½-ft elevation. Throughs from these screens are discharged to remaining group of bins.

Choice of glazed tile for bin construction material was made for several reasons: Bins of laminated wood, for many years the popular choice, were more expensive and could not offer proper support for the screening plant. Steel presented corrosion problems.

Besides offering good support for screening plant and good wear properties, glazed tile also offers the material excellent protection against moisture. Tiles' pleasing

CUT MIXING COSTS!
STEP UP PRODUCTION!
with
"U.S." Drum Handling Equipment

FIBRE DRUM TUMBLERS



For fastest, most efficient dry color mixing in your own or suppliers' fibre drums. Saves cleaning and handling time. Loads and unloads quickly, blends thoroughly. Economically priced, sturdily built and readily adjustable to any size fibre drum. Two-drum capacity; handles loads up to 500 lbs. per drum. Standard equipment includes ¾ h.p. motor; higher h.p. motors available.

HEAVY DUTY DRUM TUMBLERS

These units provide quick, effective, economical mixing and blending of dry colors with plastic molding compounds. Made in two sizes to handle either one or two standard 55-gallon drums. Ruggedly built for long life and smoothest tumbling action. Handles loads up to 1000 lbs. per drum. Yoke opens quickly and easily, locks securely. Heavy duty 1 h.p. motor; constant or variable speed drive.

Units for 10- or 30-gallon drums also available.

DRUM ROLLERS

Easy, time-saving mixing of powders or solutions—right in their shipping drums. "U. S." adjustable Drum Rollers handle any round container from 5-gallon pail to 55-gallon drum. Sturdy rubber wheels can be positioned to clear hoops and bung openings. Made in 1, 2, 3, or 4 drum capacities, with constant or variable speed drive. Loads up to 750 lbs. per drum handled easily. Special mixing containers also available.

Write for Bulletin 280

18F

PROCESS EQUIPMENT DIVISION
U. S. STONEWARE
AKRON 9, OHIO

Check 3538 opposite last page.

How "Containerization" Cuts Waste Disposal Costs In the Chemical Industry

Partial List of USERS

Allied Chemical & Dye Corp.
American Viscose Corp.
Celanese Corp. of America
Columbia Sou. Chemical Corp.
Dow Chemical Co.
E. I. Du Pont
Eli Lilly Co.
International Min. & Chem. Corp.
Koppers Company, Inc.
Merck & Co., Inc.
Monsanto Chemical Co.
National Aniline Div.
Nat. Petro Chemical Corp.
Pennsylvania Ind. Chem. Corp.
Rohm & Haas Co.
Tenn. Products & Chem. Corp.
Texas Eastman Company
Wallerstein Co.
Whitmoyer Laboratories, Inc.
Wyandotte Chemical Co.

One-Man Dempster-Dumpster System Handles Waste Disposal For Entire Plant

Economical disposal of chemical-plant waste and improved "housekeeping" are the rewards of "Containerization." Clean, big-capacity Dempster-Dumster Containers placed at inside and outside points of accumulation provide enclosed, fire-proof, scatter-proof storage for waste. One man, driving a truck-mounted Dempster-Dumpster, picks up, hauls, empties and returns each Container. The savings are obvious . . . improvement in plant cleanliness is astonishing! You may purchase your own system, or the Dempster-Dumpster Contract Hauler in your area will place Containers in your plant and empty them for a nominal fee.

WRITE TODAY
for your free copy of: "How to Cut Waste Disposal Costs" or, write for the name of the Dempster-Dumpster Contract Hauler in your area.

DEMPSTER BROTHERS, Knoxville 17, Tenn., Dept. CP-2

brown appearance contributes much to color dynamics of Ottawa Silica's modern plant.

(Bins are manufactured by Industrial Storage Bin Div., Kalamazoo Tank & Silo Co., 508 Harrison, Kalamazoo, Michigan.)

Check 3539 opposite last page.

Provides quick way of attaching load to continuous cable

Uses: For car pulling, barge moving, rigging, or any job where load must be connected to line.

Features: Fitting provides quick way of attaching load to continuous cable.

Description: Cable clamp is three-part fitting consisting of wedge clamp, wedge, and cable clip. To attach load to cable, wedge clamp is placed on cable with small end in direction of cable pull. Wedge is then inserted. Cable clip passes through eye of wedge and locks it in place. Clevis and pin are frequently used to attach load to clamp. Clamps are manufactured for rope sizes from ⅜ to 1¼".

(Cable clamp is available from Sauerman Brothers, Inc., 624 S. 28th Ave., Bellwood, Ill.)

Check 3540 opposite last page.

Permanent plate magnet

Illustrated catalog of eight pages contains comparative performance charts and graphs showing how to select exact type and size of plate magnet for a particular installation. Complete specifications on permanent plate magnets are presented. Bul 1071-P — Stearns Magnetic Products, 635 South 28th St., Milwaukee 46, Wisconsin.

Check 3541 opposite last page.

For more information on product at right, specify 3542 . . . see information request blank opposite last page.

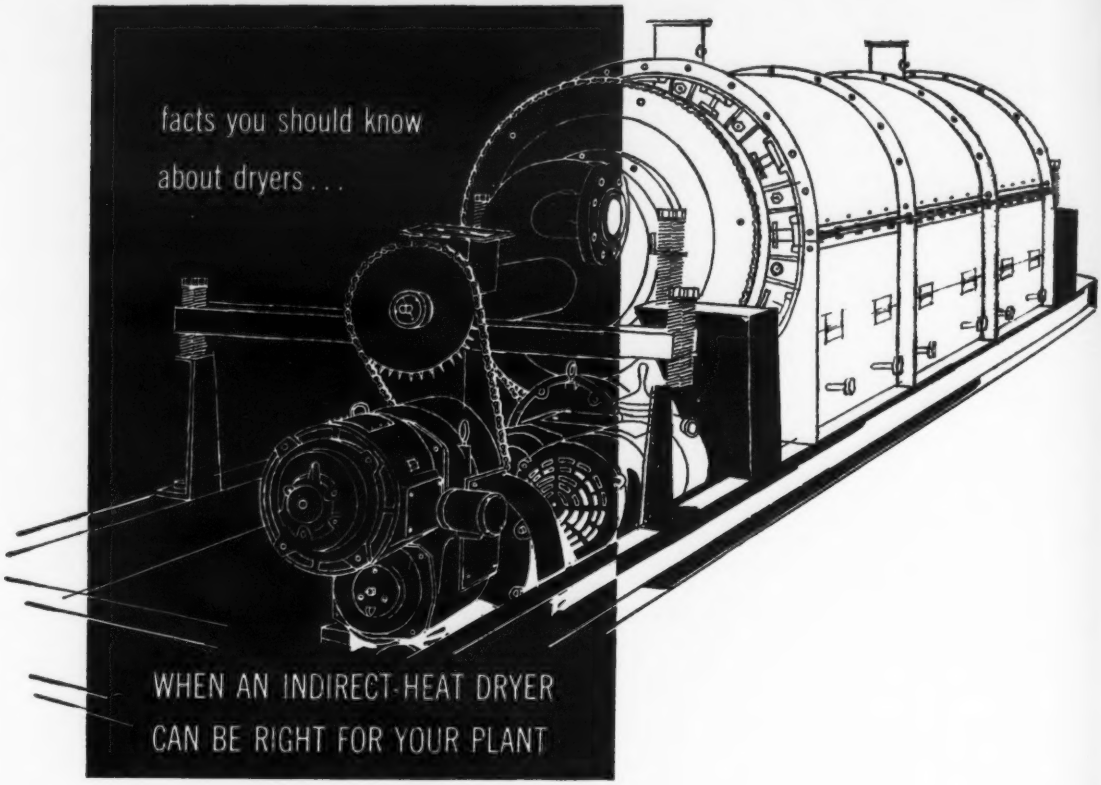
New! A unique system for avoiding production delays

Just recently, Clark Equipment Company inaugurated a communications system among dealers, its parts supply division, and its four plants, using electronic data processing and transmission equipment. Thus, when you need a specific truck or part that is not available locally, you obtain a fast answer through Clark headquarters and the entire dealer network.

All requests are put through data processing equipment for immediate action. Headquarters communicates with dealers individually, regionally, or nationally for information that will give you an answer in minutes. The system provides service unparalleled in the materials handling industry.

For details of this modern, new communications network and how it will affect your operations, simply write: Network, Clark Equipment Co., Battle Creek, Michigan.

CLARK® EQUIPMENT



For over 55 years, Louisville Dryers have been solving industry's drying problems and effecting marked economies. The records of this experience can often be applied to specific cases, possibly yours. For example . . .

Q. *My material is a filter cake, practically all minus 325 mesh, and must not contact furnace gases. It can be heated to 500° F. at least, without injury. What type of dryer would do the job best?*

A. You might consider using a direct-heat rotary dryer that utilizes clean, heated air as the drying medium—air heated by steam coils or a gas or oil fired heat exchanger. However, this introduces a considerable dust collection problem. Besides, from a standpoint of capacity, it is inefficient as well as from a heat-cost standpoint. This makes it unduly expensive. Therefore, a type of indirect-heat rotary dryer is indicated which would greatly reduce both the dust problem and the heat cost.

Q. *What is meant by an indirect-heat rotary dryer?*

A. One in which the material to be dried is warmed by contact with the heated metal surfaces, which in turn are heated by the medium used (usually furnace gases or steam). Those using furnace gases are called "indirect fire dryers". Atmospheric and vacuum drum dryers are examples of steam-heated indirect dryers, but the type in greatest use is the steam tube dryer. This is often referred to as the "Louisville Type" because of the thousands of Louisville Steam Tube Dryers built during the past 55 years.

Q. *How does an indirect-heat dryer minimize the dust problem?*

A. In an indirect-heat dryer, only enough air is admitted to carry off the evaporated moisture. Thus, the air has nothing to do with the heating of the material. Generally, this low air velocity results in insignificant dust loss.

Q. *How does this differ from the operation of a direct-heat dryer?*

A. In direct-heat dryers, the hot air furnishes the heat for drying besides removing the evaporated moisture. The amount needed to supply the necessary heat results in a sufficiently high velocity through the dryer to carry out an excessive amount of fine material particles.

Q. *It seems I need an indirect-heat dryer. How can I get competent advice and more information regarding my particular requirements?*

A. The Louisville Dryer engineering staff will be glad to analyze your requirements, arrange for necessary pilot plant tests, and submit an unbiased recommendation accompanied by estimated costs. You incur no obligation by using this service.

PROCESS EQUIPMENT DIVISION
GENERAL AMERICAN
TRADE MARK

LOUISVILLE DRYING MACHINERY UNIT

GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer General Sales Office: 139 So. Fourth Street, Louisville 2, Kentucky
Eastern Sales Office: 380 Madison Avenue, New York 17, New York
In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario, Canada
General Offices: 135 S. La Salle Street, Chicago 90, Illinois

Check 3543 opposite last page.

Plate circuit relays of control console ease maintenance

Uses: For controlling operations such as bulk weighing, filling, etc.

Features: Each plate circuit relay is enclosed in polystyrene case with standard plug. All contacts are silver. Small, compact units plug into standard sockets inside control console. This simplifies maintenance by providing for easy replacement.

Description: Console consists of control panel and cabinet for housing control elements. It can be remotely located from weighing point in an office or in any convenient location at a distance up to 1000 feet. Operator is able to observe an entire batching or weighing operation from the console. Pilot lights allow him to follow operation from the beginning through all stages to end.

Recording unit is located on shelf of console so that weight figures are readily available. If total or sub-total of weights is desired, the operator can press button and receive this figure. Number of cycles can be preset, and system permitted to operate through this number automatically. As each cycle is completed, number is recorded on the digital indicator so that it is possible to see the number of weighing operations completed at any time.

(Control console is product of Toledo Scale Company, Toledo 1, Ohio.)

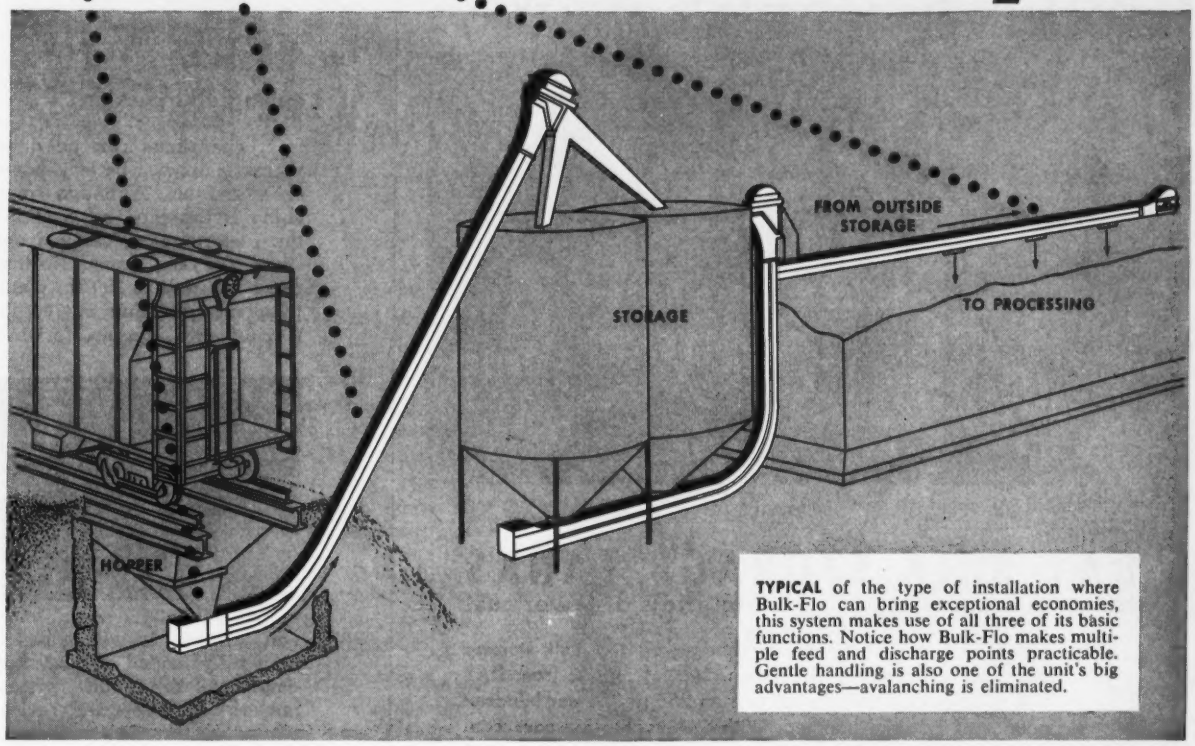
Check 3544 opposite last page.

Liquid handling equipment

Catalog of 100 pages covers loading-arm assemblies, loading valves, swing joints, truck tank equipment, storage tank fittings, and miscellaneous products for efficient handling of bulk liquids. Specifications, diagrammatic views, and recommended applications on all products are contained. Cat 65 — Wheaton Brass Works, Springfield Road, Union, N. J.

Check 3545 opposite last page.

It's a feeder! It's an elevator! It's a conveyor!

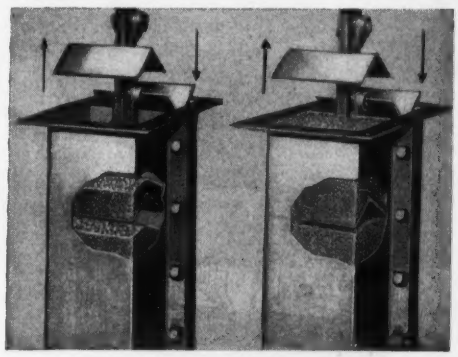


TYPICAL of the type of installation where Bulk-Flo can bring exceptional economies, this system makes use of all three of its basic functions. Notice how Bulk-Flo makes multiple feed and discharge points practicable. Gentle handling is also one of the unit's big advantages—avalanching is eliminated.

It's 3 units in 1! And LINK-BELT Bulk-Flo works equally well fully or partially loaded

With its remarkable ability to combine horizontal, vertical and inclined travel . . . to feed, convey and elevate using a single drive—Link-Belt Bulk-Flo is industry's most versatile medium for handling non-abrasive, non-corrosive materials. In fact, it often replaces several units—in less space and at lower cost.

Bulk-Flo will bring you the tremendous savings it has brought to so many other plants. Let a representative at your nearest Link-Belt office give you an unbiased answer. Or write for Book 2475.



SOLID FLIGHTS permit Bulk-Flo to operate independently of internal pressure. Thus, it needn't be loaded to full capacity in order to provide positive movement of material. Speed is constant—capacity can be varied by merely regulating amount of feed. And regardless of load, Bulk-Flo is self-clearing.

LINK-BELT

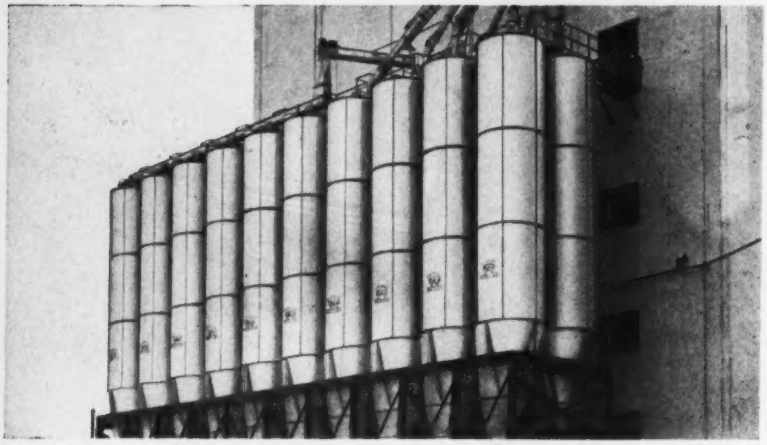
BULK-FLO FEEDERS • CONVEYORS • ELEVATORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,802

Check 3546 opposite last page.

DAY

BULK STORAGE NEWS

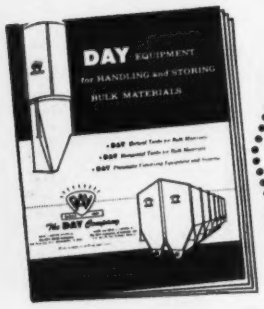


A battery of 20 DAY vertical bulk storage tanks serving packaging line as well as truck and rail car loading operation. Each tank section holds approximately a carload of ingredients.

DAY BULK STORAGE TANKS

No other method stores bulk materials at lower cost

SAVINGS is one of the big advantages of DAY bulk storage and material handling equipment. Typical reports from DAY bulk tank owners tell of savings from 25¢ to 35¢ per hundred pounds of material handled. With DAY tanks, you save container or bag costs, you save labor, you save storage space and you save "invisible loss" because there's no spillage or breakage. DAY tanks improve plant efficiency and keep costs down.



For the most complete line of economical bulk tanks in vertical and horizontal styles, turn toDAY, now. Increase your plant's operating efficiency, lower material handling costs, improve sanitation and housekeeping with DAY bulk tanks. Free bulletin tells how to handle bulk material at lower cost with DAY units. Write toDAY for Bulletin 574.

The **DAY** *Company*

SOLD in UNITED STATES by
The DAY SALES Company
852 Third Ave. N.E., Minneapolis 13, Minn.

MADE and SOLD in CANADA by
The DAY Company of Canada Limited
P.O. Box 70Y, Fort William, Ontario

Representatives in Principal Cities

EQUIPMENT ONLY OR A COMPLETE SYSTEM

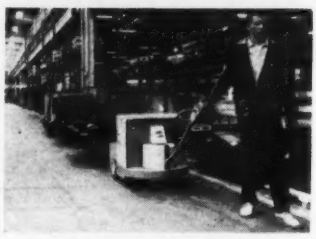
Check 3547 opposite last page.

LATEST INDUSTRIAL TRUCK DEVELOPMENTS

. . . in design, capacity, operating features, and accessories for improved performance and safety

Pulling and pushing . . .

. . . operations can be done with compact, battery-powered tractor. Although machine is designed as "walkie" type, operator can sit on front cover for long runs. Normal draw-bar pull is 200 lb, while break-away rating is 700 lb. Having two speeds forward



and reverse, it will travel 2 mph fully loaded and 3.2 mph empty. Twelve-volt system powers high-torque, series-wound motor. Two models of different lengths are available — single row battery is 39¼" long and double row battery is 44⅝" Overall width for both models is 32". ("Powrworker" tractors are manufactured by Clark Equipment Co., Battle Creek, Mich.)

Check 3548 opposite last page.

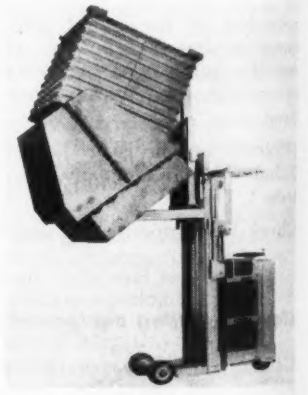
Extra long loads . . .

. . . can be handled easily by this 20,000-lb capacity low-lift platform truck. Available with either electric or gasoline-electric power, truck has two-wheel drive and all-wheel steer. Frame is built of heavy steel plate, formed and electrically welded. Platform is raised by double-acting hydraulic cylinder. Rocking-link platform-lift with powered lowering accomplished with full inching control through a control valve is featured. Safety link protects lift mechanism in event platform is rammed against an obstruction. (Model L-15 platform truck is manufactured by Elwell-Parker Electric Co., 4025 St. Clair Ave., Cleveland 3, Ohio.)

Check 3549 opposite last page.

Special attachment . . .

. . . for handling drop bottom boxes is available for use on manufacturer's narrow aisle platform or straddle trucks. Attachment consists of a hydraulic cylinder mounted at rear of platform (or forks) which elevates a broad hook interlocking with a mating hook on the box. As rear of box raises, swivel bottom swings down, allowing contents to flow out. Amount of flow can be controlled by size of opening, and dumping may



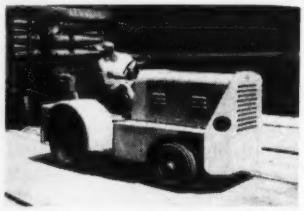
be done at any point in truck's range of elevation. Dumping control is in operator's compartment.

Attachment extends out over rear of platform only 4" so truck can also be used for stacking conventional skid loads in 6' aisles when not handling drop-bottom boxes. Attachment for handling drop-bottom boxes is available from The Raymond Corp., 58-157 Madison Ave., Greene, N.Y.

Check 3550 opposite last page.

Lower profile and compactness . . .

. . . are features of two industrial towing tractors added to manufacturer's material handling equipment line. Tractors are available with gasoline, diesel, or LP gas engines that develop 74 brake



horsepower and 170 ft lb torque at 1200 rpm. Units have pulling capacity of 90 to 100 tons on level surfaces.

Overall length of tractors is 101", height, 57½", and width, 66". They have an under clearance at center of 9". Model TG-45 and Model TG-50 industrial towing tractors are product of Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 3551 opposite last page.

Small, versatile lift truck

Bulletin of four pages describes and illustrates electric lift truck model redesigned to provide smaller, more versatile and more maneuverable lift truck at a low cost. Operating features and specifications are included. Pug bul — Hustler Corporation, 17799 Elm Rd., Willoughby, Ohio.

Check 3552 opposite last page.

It's easier to solve your conveying problems *with*

DIAMOND *Conveyor Chain*

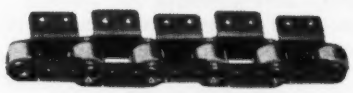
DIAMOND Conveyor Chain's high operating efficiency, precision and versatility make it ideal for conveying and automated operations of all types.

Conveying and synchronizing problems—such as automatic assembly, filling, packaging and folding—are speedily solved by DIAMOND Chain's uniform pitch and smooth action. A wide range of extended pins and attachments permits almost any interval or sequence set-up desired.

For conveying, lifting and transporting—DIAMOND'S toughness, efficiency and long service life help reduce operating and service costs, minimize maintenance.

Where corrosion or product contamination is a problem—DIAMOND Stainless Steel Conveyor Chain supplies the answer.

STRAIGHT ATTACHMENT—one side



BENT ATTACHMENT—both sides

BENT ATTACHMENT—one side

EXTENDED PIN—one side

● Your nearby DIAMOND Distributor can supply all types of conveyor chains and sprockets, plus expert engineering assistance to solve special conveying problems. Look under "Chains" or "Chains, Roller" in the YELLOW PAGES . . . or write to factory for Conveyor Catalog and name of your nearest Distributor.

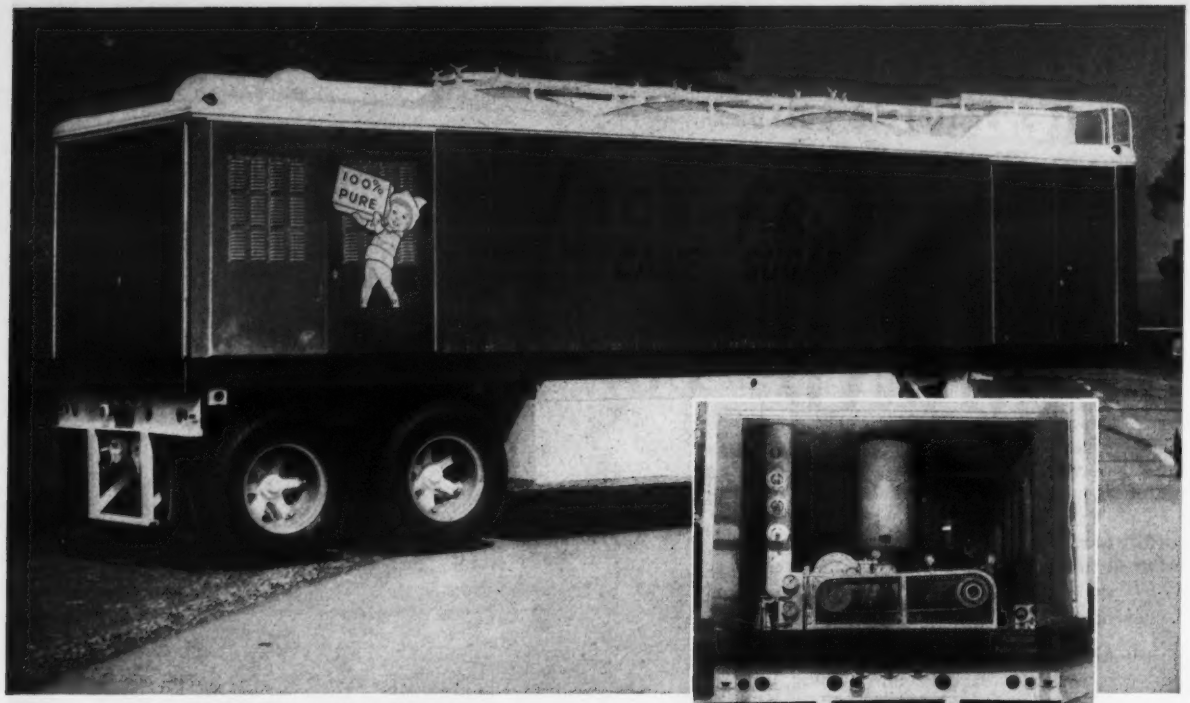
DIAMOND CHAIN COMPANY, INC.

A Subsidiary of American Steel Foundries

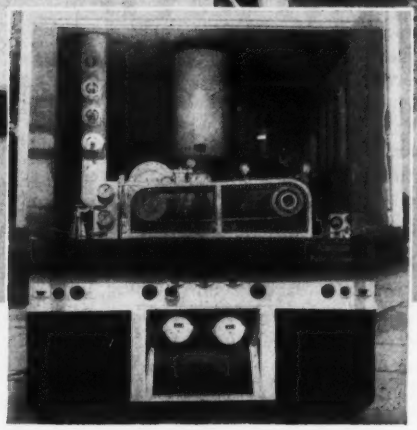
402 KENTUCKY AVENUE, INDIANAPOLIS 7, INDIANA

Offices and Distributors in All Principal Cities

Check 3553 opposite last page.



Side view of the new Fuller Airveyor Bulk Transport.



Rear view showing engine and blower compartment and controls. Note connections for flexible hoses. Hoses normally carried in underslung locker.

FULLER ENGINEERS CREATE SELF-LOADING AND UNLOADING TRAILER FOR HANDLING BULK INGREDIENTS

The new Airveyor® Bulk Transport was designed to handle such materials as sugar, malt, grain, lime and pulverized or pelleted plastics.

Processors and manufacturers now using bags and drums welcome this new shipping medium as a boon—it cuts costs and reduces loading and unloading time.

This new trailer can be loaded by gravity from an overhead bin, or it can be filled by means of a suction line from any type of railroad car; payload space is 800 cu. ft.

The trailer is self-unloading by means of a pneumatic system of the pressure type. Unloading rates vary from 20 to 50 tons per hour, depending on type of material involved and the conveying distance, which may be 200 feet or longer.

A special feature is that no rotary airlocks are being used to feed the material into the pressure line. Outside of remotely-set valves, there are no moving parts whatever—no grinding, no wear, and no particle degradation from rotating feeder vanes.

Another, equally important, feature is that the pneumatic conveying system is of the closed circuit type. The same air is being used over and over again. This eliminates the necessity of dust collectors at a consumer's plant. All that is needed is a bin with two pipes, to which the trailer connects by means of flexible hose. The closed circuit also prevents the transfer of atmospheric moisture to the material conveyed. For the purpose of purifying the return air, a dust collector has been built into the nose of the trailer.

The power plant is located in the rear of the trailer and consists of a gasoline engine driving a positive-pressure blower.

This extremely practical piece of equipment is another new development by Fuller materials handling engineers, backed by more than 30 years in pneumatic conveying. Consult Fuller about your bulk handling problems.

FULLER COMPANY A-244 3684

136 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

Birmingham • Chicago • Kansas City • Los Angeles • San Francisco • Seattle

Fuller ... pioneers in harnessing AIR

FULLER COMPANY GENERAL AMERICAN TRADE MARK

Check 3554 opposite last page.

Front-dumps loads over 750 lb at heights to 40'

Uses: For dumping any single type of container, including steel drums, cable reels, box trucks, bucket skips, and detachable steel trucks.

Features: Unit provides front-dumping for loads over 750 pounds to required dumping height.

Description: Model is designed for rear load — front discharge from heights up to 40'. It can be furnished in either portable or stationary models. Controls normally furnished are pushbutton, and of the dead-man type.

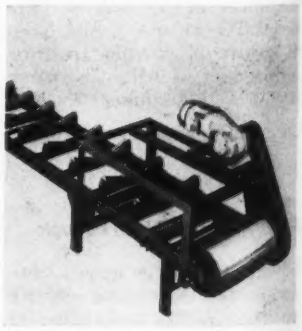
Dumper has welded steel frame and cross-bracing for extra rigidity. Discharge may be equipped with various chutes, slides, or dust-controlling types of spouts.

(Model 36 PowRdumper is product of Langley Manufacturing Company, 920 E. Cambridge St., Cambridge 41, Massachusetts.)

Check 3555 opposite last page.

Add troughing belt to conveyor line

Standard-duty troughing belt conveyor for handling bulk material has been added to manufacturer's line of conveying equipment. Available in 18 and 24" widths, conveyor can be supplied with rubber, neoprene, or canvas belts.



Standard-duty troughing belt conveyor for handling scrap or other bulk material

Roller of 2" in diameter is used. It has a 187-12SG ball-bearing equipped with a neoprene seal, and is grease packed.

(Standard-duty troughing belt conveyor is product of Sage Equipment Company, Inc., 30 Essex St., Buffalo 13, New York.)

Check 3556 opposite last page.

Bin provides practical way of storing small parts in limited floor space

Stacking-type, all-steel storage bin with four-way entrance, provides practical method for storing small parts in limited space.

Of heavy steel plate construction, bin has legs and corner reinforcements of angle iron. Heavy corner plates are provided for stacking, and top edges flanged all the way around to give extra strength. Inside dimensions are 36 x 36 x 24".

(All-steel storage bin is product of Palmer-Shile Company, 16016 Fullerton, Detroit 27, Michigan.)

Check 3557 opposite last page.

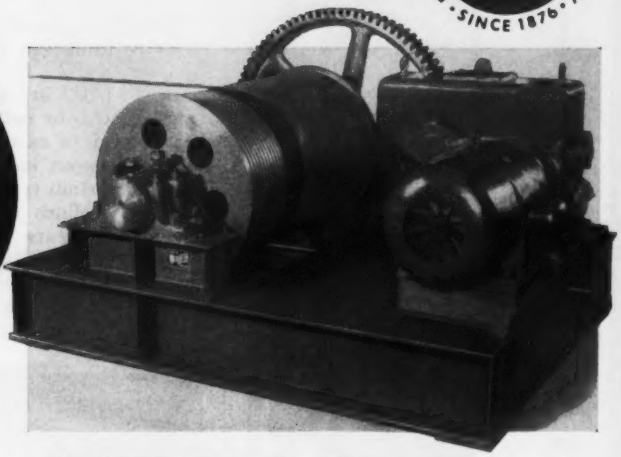
Material handling your baby?

If you are concerned with material handling in your plant from a top or plant management, engineering, purchasing, or financing standpoint, then you will be interested in reading what these management levels have to say about the role of material handling in the chemical processing plant. Their discussions will make up a major part of a feature devoted to material handling in next month's CHEMICAL PROCESSING. Other topics will include latest trends and developments in material handling equipment, and case history stories telling how chemical processing companies have realized savings from improved material handling procedures.

SAVE TIME SAVE MONEY...

WITH Webster CAR MOVERS

ELEVATING AND CONVEYING MACHINERY · SINCE 1876 ·



DRUM-TYPE, Fluid Drive

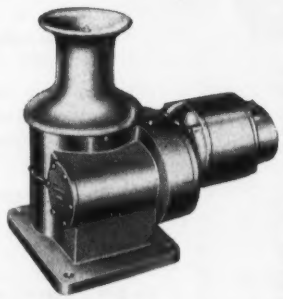
This 50 hp WEBSTER Car Mover was supplied for a prominent paper company in Pensacola, Fla., and similar unit for terminal grain elevator in New Orleans, La. It is capable of moving fourteen 75-ton railroad cars along a straight track, up a 1% grade, at a speed of 40 ft. per minute. Fluid drive provides shock-absorbing cushion between motor and gears, prevents damage from overloading, and eliminates necessity for expensive controls.

One-man operation, always ready, always safe, push-button control.

WEBSTER Car Movers are made in a complete range of sizes in fixed and portable capstan, drum, and continuous types. Years of dependable service are assured by rugged frames and castings, extra-heavy machine-cut gears, and weatherproof construction.

Write for Bulletin 60E.

VERTICAL CAPSTAN-TYPE with Integral Motor



The diameter and length of capstan on WEBSTER Car Pullers are designed to give long life to the ropes, and provide the necessary traction for pulling the load—with little effort on the part of the operator. A high-torque, totally enclosed hoist-type, non-ventilating motor is an integral part of the unit. Available in two standard sizes of 5,000 or 10,000 pounds rope pull at 40 feet per minute.

WEBSTER MANUFACTURING, INC.

Dept. C-28,

TIFFIN, OHIO

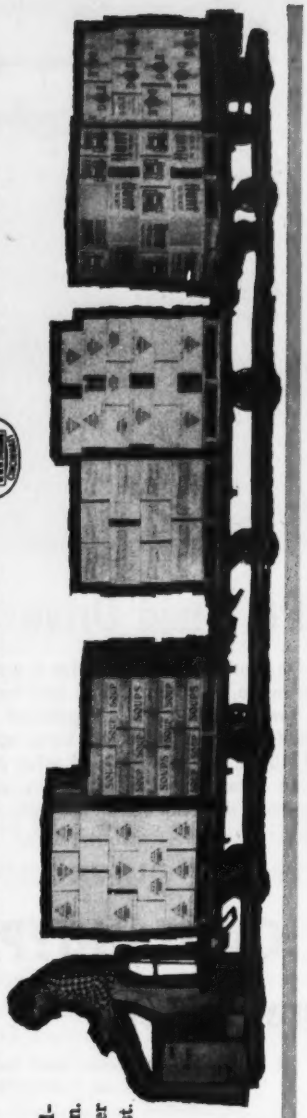
Offices in All Principal Cities

Webster

SINCE 1876

BULK MATERIALS HANDLING EQUIPMENT

Check 3558 opposite last page.



STUEBING Designed • Engineered • Built

HydroLectric A GREAT NAME IN LIFT TRUCKS

This powerful Hydrolectric Tractor hauls one or multiple units with speed, safety and ease of operation. Features the exclusive DYNA-DUAL POWER UNIT. Power enough to pull loads of 6000 lbs. or more at low cost.

Write for Bulletin KT

LIFT TRUCKS, INC.

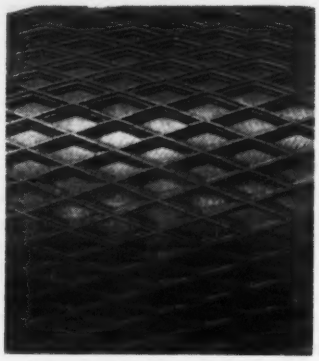
2427 Spring Grove Avenue, Cincinnati 14, Ohio

Check 3559 opposite last page.

'Step-down' designed belt can carry packages up steep incline

Individual gripping 'fingers' adjust to uneven surfaces

With ribs in three size stages, conveyor belt has gripping power to carry all types of packages on inclines up to 35°, and certain types of packages on inclines considerably steeper. Ribs are constructed with "step-down" design, so that, as each step wears down, a new rib will be presented for use.



Conveyor belt has hundreds of individual gripping "fingers"

Crossed-rib design is siped at regular intervals to provide hundreds of individual gripping "fingers" which adjust to uneven surfaces. Belting is manufactured in either tan or black color. It is available in square-edge slabs up to 60" wide and 500' long.

(Wedge-Grip conveyor belt is product of Goodyear Tire & Rubber Company, Akron 16, Ohio.)

Check 3560 opposite last page.

Engine parts, service info

Bulletin of four pages tells how manufacturer's parts and service organization assures that service requirements will be filled promptly and dependably. Countrywide parts and service locations are listed. Bul BU-410 — Allis-Chalmers Mfg. Co., Box 512, Milwaukee 1, Wis.

Check 3561 opposite last page.

EFFECTIVE, ALL-DIRECTIONAL

VIBROLATION

MOVES GRANULAR OR WET MATERIAL NOISELESSLY

The simplest, most quiet answer for moving materials in hoppers, chutes and bins. One moving part, no lubrication, no maintenance, never harms the equipment on which it is mounted. Instantly self-starting every time. Vibrolator is the only vibrator that can guarantee this regardless of operating conditions. Write for catalog. You will also receive form for describing your problem. No obligation!

VIBROLATORS®

®Vibrolator is a registered trade name and applies only to the patented Peterson Vibrolator.

MARTIN ENGINEERING COMPANY

155 KEMP ST. NEPONSET, ILL.

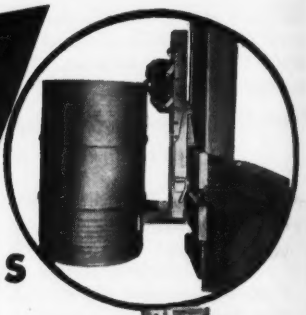
Check 3562 opposite last page.

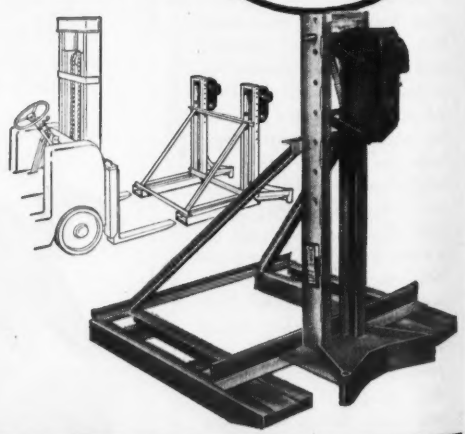
USE THE

LIFT-O-MATIC POWER TRUCK ATTACHMENT

***for* HANDLING DRUMS *with a* POWER FORK TRUCK**

WITH FORKS LEFT ON OR REMOVED





Simple, automatic, mechanical handling of any size or type of drum—single or multiple.

WRITE FOR CATALOG **MARVEL INDUSTRIES, Inc.**

2234 CLEVELAND ST., EVANSTON, ILLINOIS

Check 3563 opposite last page.

Tests in container manufacturer's laboratory indicated linings which would produce proper package for Velsicol's technical chlordane

Suppose you'd like to package your product in steel containers, but the product is incompatible with either the steel or most linings, or both. Take a look at what Velsicol Chemical Corp. did when confronted with that very same problem: Enlist the aid of the container manufacturer, who will undertake to come up with . . .

Tailor-made linings — a service to you

Problem: When Velsicol Chemical Corporation started its search for a suitable package to contain technical chlordane, they found that the job wasn't going to be an easy one. If chlordane were packaged improperly, it could result in a decrease in its effectiveness as an ingredient in insecticide formulations.

It was determined that a steel container would offer the best protection during storage and shipping. However, there was the possibility of auto-catalytic reaction between chlordane and unlined steel — and technical chlordane is a solvent for many commercial container linings.

Solution: Velsicol had chosen a five-gallon pail as the package — so they called upon the container manufacturer to assist them in finding a suitable pail lining.

Samples of the material

to purify your product . . .

SHAKE IT LOOSE from IRON PARTICLES with FERROFILTER

Powerful, adjustable vibrator provides right amount of shake for type of material handled. Material sifts through strongly magnetized grids which attract and hold iron particles until current is shut off.

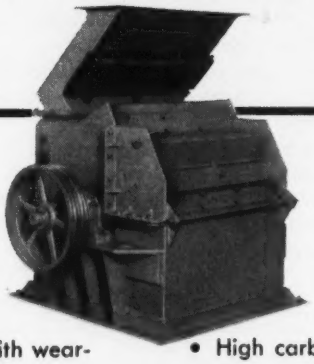
ELECTROMAGNETIC SEPARATORS

Other FERROFILTERS available for removing contaminating magnetic particles from liquids and slurries.
For information on complete line, write for
BULLETIN 46-E

S. G. FRANTZ CO., Inc,
Brunswick Pike & Kline Ave.
P. O. Box 1138 Trenton 6, N. J.

Check 3564 opposite last page.

BAUER SWING HAMMER BREAKER FOR COARSE GRINDING AND CRUSHING



- Heavy duty mill with wear-resisting swing hammers
- Handles friable material up to 10″ lump size
- Magnetic protection optional
- High carbon steel grate bar spacing or screens to meet your needs
- Flywheel absorbs shock loads
- Write for complete information

THE BAUER BROS. CO.
1728 SHERIDAN AVE., SPRINGFIELD, OHIO

Check 3565 opposite last page.

were submitted to the pail manufacturer, who used the samples to conduct a series of laboratory tests. These lab runs consist of setting up test cups, lined with possible linings, filling them with material, and letting them set for a period of time.

After cups are filled with product, they are covered over with glass and sealed. They are then checked once a week to determine any reaction of the product with the lining.

As a result of lab tests to determine lining to offer excellent shelf-life, Velsicol is assured of maximum protection for their product, both in storage and shipping

Upon completion of test period — usually six months or more — the manufacturer is in a position to recommend one or several linings to the chemical producer. In Velsicol's case, a high-bake modified phenolic lining was recommended.

Velsicol also conducted exhaustive tests, before final laboratory approval was given to the lining. These tests took into consideration the atmospheric conditions at which the container would be filled; the many different climatic conditions the product would encounter in transit; and the conditions under which the package would be stored and handled at their factory, in shipment and at the formulators.

Results: By working along

To page 147

"Another product safely shipped in Inland 'protection-eered' containers"*

IT'S COME A LONG, LONG WAY...

The leather that is . . . Used to be, back in Calamity Jane's time, that leather goods and wearing apparel were mighty cumbersome. And colors were pretty much restricted to those endowed by the poor departed original four-legged owner.

Today, thanks in large part to products of the chemical industry, leather has taken its place as a versatile, "high fashion" material. Rohm & Haas Company, for example, a pioneer producer of leather chemicals, manufactures highly pigmented nitrocellulose lacquers used in formulating flexible color coats for leather of various types.

Maintenance of the color uniformity and purity during shipment is important to tanners who use these finishes. That's why these lacquers are shipped in Inland pails with a special lining, tailor-made to protect the contents.

Do you have a product that requires special protection during shipment? If so, it will pay you to let Inland's packaging experts go to work on your problem. Write Bob Boecher, Dept. 335C.

**the right container, with the right lining for your product*

INLAND STEEL CONTAINER COMPANY

member of the INLAND *steel family*

6532 South Menard Avenue, Chicago 38, Illinois

Plants: Chicago · Jersey City · New Orleans

Cleveland and Greenville, Ohio. *Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.*

Check 3566 opposite last page.

For more information on product at right, specify 3567 . . . see information request blank opposite last page.

this is a MULTIWALL BAG with a * BACKGROUND by...

* This is Raymond Pre-printed Linen Background on 50 lb. unbleached multiwall kraft which can be economically combined with your regular bag design and specifications. Other Raymond basic background designs and colors are available on colored, bleached or semi-bleached kraft. For full details on the interesting possibilities this new packaging concept can give your product, see, write or call your Raymond representative.

Raymond
BAG CORPORATION

A division of Albemarle Paper Mfg. Co.

MIDDLETOWN, OHIO • RICHMOND, VA.

with the container manufacturer, Velsicol was able to come up with a package offering maximum protection for their product, both in storage and transit. Tests proved the stability of the interior lining — and of the package — under these conditions without large investment of time, money and product.

(Lined steel containers are manufactured by Vulcan Containers Inc., Bellwood, Ill.)

Check 3568 opposite last page.

Bouncing bag packer fills, packs twelve 100-lb bags/min

Uses: For packing burlap, cotton, and jute bags.

Features: Machine tightly packs, as it fills, up to twelve 100-pound bags a minute. Unit operates without noise or vibration and provides smaller, more compact packages.

Description: Bag packer uses vertical jouncing action which jounces or impacts material into bag held securely in place by clamps. Operator attaches bag to an air-operated foot-controlled bag holder while packer is stopped. On release of foot pedal, bag-clamps lock bag to spout and packer starts immediately. After material is tightly packed, operator presses pedal to drop bag onto conveyor or sewing belt. Scale cannot discharge with bag holder open. Standard bag holders are equipped with quick-change clamps so that various size round spouts or almond-shaped spouts may be applied at will.

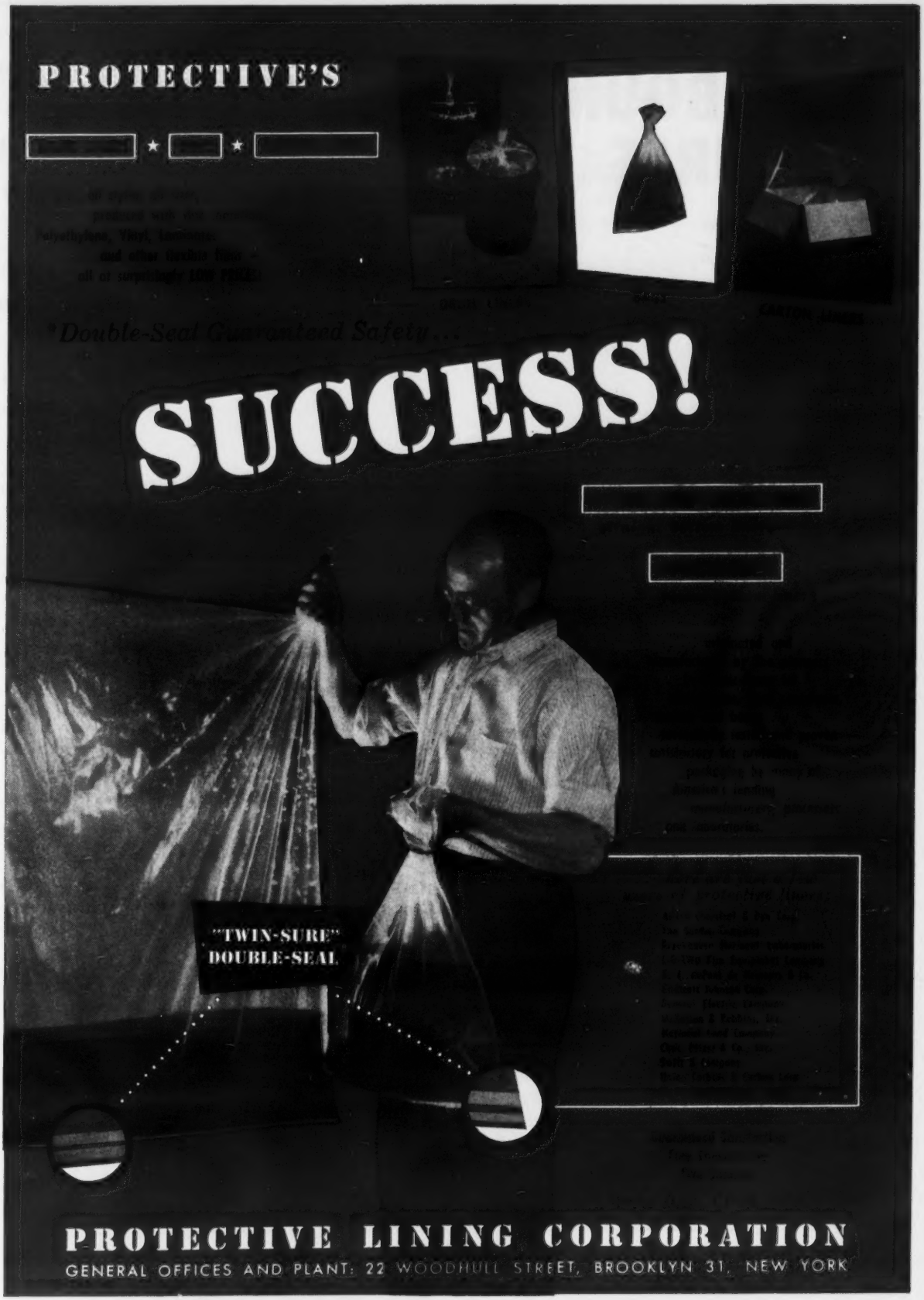
(G-73 Impacker is product of Richardson Scale Co., Van Houten Ave., Clifton, N.J.)

Check 3569 opposite last page.

Secures lumber loads

Booklet of six pages describes simplified yet damage-proof method of packaging and shipping lumber by freight car. Bul AD232 — Acme Steel Co., 135th St. and Perry Ave., Chicago 27, Ill.

Check 3570 opposite last page.

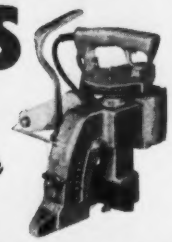


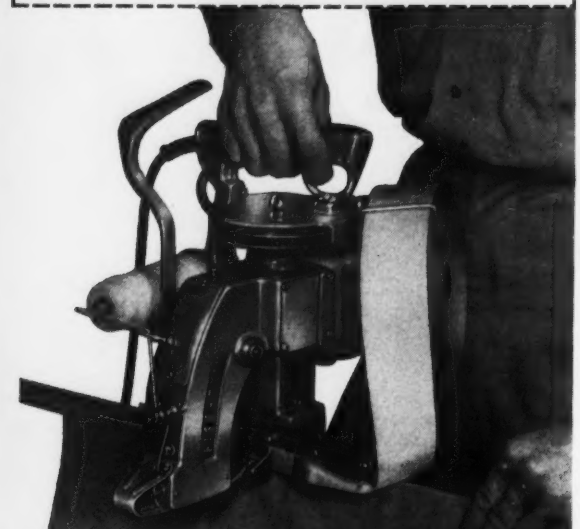
Check 3571 opposite last page.

NOW!

TAPE-BOUND CLOSURES

with the FISCHBEIN Portable BAG CLOSER



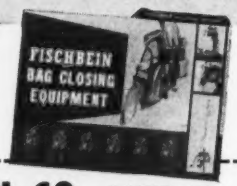


FISCHBEIN FASEAL

TAPE BINDING ATTACHMENT

- Perfect tape-bound closures
- Complete portability maintained
- Quickly removed when tape binding is not required
- Simple! Versatile! Economical!

FOR DETAILS and complete CATALOG FILE of FISCHBEIN BAG CLOSING EQUIPMENT, mail coupon to:



DAVE FISCHBEIN CO., DEPT. 9B

2720 30th Avenue South, Minneapolis 6, Minn.

Name_____

Firm Name_____

Address_____

Check 3572 opposite last page.

PACKAGING

Car may be coopered before loading begins with bulk loader

Maintenance extremely low

Uses: For loading bulk material.

Features: Car may be entirely coopered before loading begins. Maintenance on loader unit is negligible.

Description: Bulk loader model has rated capacity of 25 tons per hour on such material as chemicals, grain, heavy feeds, pellets, linseed grits, and salt. Sealed ball bearings are used on all shafts, and electrical equipment is of dust-proof construction.

(Model BL-10 bulk loader is product of Runco Corporation, 126 Liston Ave., Kenmore 23, New York.)

Check 3573 opposite last page.

Aerosol newsletter

Believed to be the first such newsletter to be distributed by an aerosol filler, this six-page bulletin includes news and comment on developments in the field plus a technical paper dealing with pressurized nitrogen aersols. It will be sent free to interested individuals. "Pressure Gauge" — Aerosol Techniques, Inc., 111 Silliman Ave., Bridgeport, Connecticut.

Check 3574 opposite last page.

New tank car design eliminates dome, and underframe

Weighs less, costs less — carries more, more versatile

"What's new in tank cars?" According to its manufacturer, this latest development in tank car design "weighs less, costs less, carries more, and has greater versatility. It is stronger, safer, more efficient to operate, maintain, load and unload, and inspect than any other tank car of comparable

Would you like to receive CHEMICAL PROCESSING personally?

It will be sent to you without charge or obligation . . .

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If you are responsible for processing operations in an administrative capacity as plant superintendent, chemical engineer, chemist, engineer or equivalent responsibility . . . in a plant of substantial operations* where chemical processing is an important factor . . . CHEMICAL PROCESSING will be sent to you without charge or obligation if you request it. Use form below. In requesting, be sure to answer all questions. If your firm is not rated or listed in standard references, indicate size of the company by capacity, annual sales or number of employees. Unless all information is given, magazine will not be sent.

*"Substantial operations" does not necessarily mean an extremely large plant. But requests for the magazine exceed supply so we must set standards to insure publication being sent where it can be used to best advantage.

CHEMICAL PROCESSING
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CHICAGO 11, ILLINOIS

Please send me CHEMICAL PROCESSING without charge or obligation

Name _____

Title _____

Company _____

Rating of Company _____

Street _____

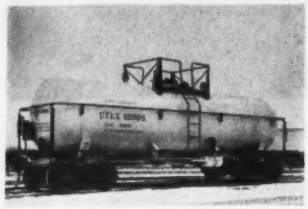
City _____ Zone ____

State _____

Main Products _____

capacity now being built."

The versatile new tank car serves where four separate tank classifications were previously required. With only minor modifications, the tank car can be used as a general service car, for carrying acid, as an insulated car, and as a low-pressure car. Built according to the "HD" design, the car has no dome and no underframe. The car weighs a little under 46,000 pounds,



New multi-purpose tank car incorporates two fundamental changes in elimination of dome and underframe

which is an eight to twelve percent reduction over cars of standard design.

Car design lends itself to larger total gallonage capacities than were ever available previously, without any increase in capacity of trucks used. This is partly because of the saving in weight of the cars once available for carrying a larger load, and partly because the elimination of underframe and dome allows room for larger diameter tank.

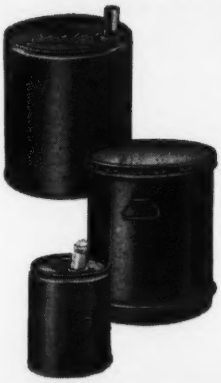
Manufacturer points out advantages to railroads due to the fact that capacity of the HD tank car increases nearly twice as much as its weight and cost, thus considerably increasing efficiency of the larger cars.

By using larger HD cars, railroads would have far fewer cars to handle and for every ton-mile hauled, their percentage of revenue-ton-miles would be much higher. On this basis, freight rates could be reduced very substantially because of larger minimum loads.

("HD" tank car is development of Union Tank Car Company, 228 North LaSalle Street, Chicago, Illinois.)

Check 3575 opposite last page.

VULCAN STEEL PAILS



The manufacturer needing a small package for his requirements can choose exactly the right size and type from the complete Vulcan line of steel pails. Vulcan offers a choice of gauges in both lug cover and closed head types in sizes ranging from one to fifteen gallons.

VULCAN STEEL DRUMS

These drums are the choice of leading manufacturers for the shipment and storage of liquids, plastics, crystals, semi-solids, and powders. All standard drum gauges are available . . . check with us regarding closures and accessories.

CHECK WITH VULCAN ON THESE TOO!

GREASE DRUMS . . . Available in both 120 and 100 pound capacities.

15 GALLON DRUMS . . . A new addition to the Vulcan line—available in open head and closed head types.

VULCAN

Vulcan offers real flexibility with a choice of linings, closures, accessories, and various painting and decorating services. Mail coupon for full information and the name of your Vulcan representative.

VULCAN CONTAINERS INC., Bellwood, Illinois

Gentlemen: I am interested in: CP-18

☐ Pails, in the following sizes_____

☐ Hi-Bake protective linings for (product)_____

☐ 55 gallon drums.

Please get this information to

Name_____

Company_____

Address_____

City_____ Zone____ State_____

Check 3576 opposite last page.

STOP

PUMP

WEAR

Hard-face pump parts with the Colmonoy Spraywelder

Your pump plungers, pistons, rings, bushings—all your pump parts—will last longer with corrosion and abrasion resistant Colmonoy alloy hard-facing.

You apply these alloys fast—with the Colmonoy Spraywelder. This powder spraying unit produces smooth overlays, within .010" of desired size. They are welded to the base metal and require a minimum of finishing.

You'll save handsomely by either eliminating expensive corrosion resistant metal components, or by eliminating the time consuming hand application of hard-facing rod and the attendant difficulties in distortion and machining. Write today for more information on how you can use the Spraywelder.

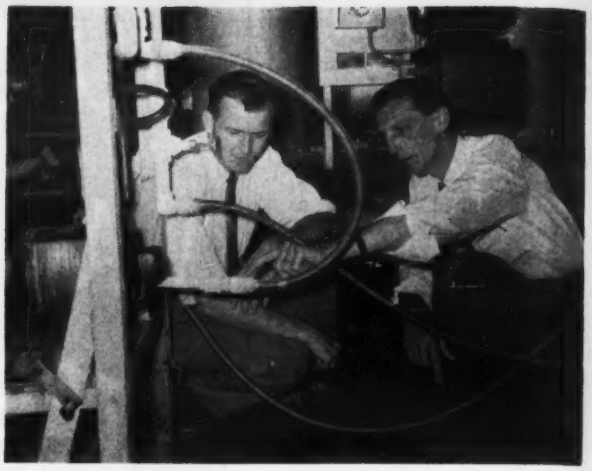
HARD-FACING ALLOYS

WALL COLMONOY

DETROIT 3, MICHIGAN

BIRMINGHAM • BUFFALO • CHICAGO • HOUSTON • LOS ANGELES
MORRISVILLE, PA. • NEW YORK • PITTSBURGH • MONTREAL • GREAT BRITAIN

Check 3577 opposite last page.



Hoses of Teflon and with quick-connecting and disconnecting fittings provide flexibility to chemical processing operations, yet withstand temperature and action of chemicals

Connecticut Chemicals (Canada) Ltd., Toronto, Ontario, manufacturers of aerosol-packaged cosmetics and insecticides, find they —

Flexibilize operations, beat corrosion using flexible Teflon hoses

FRANK E. McELROY, Associate Editor
With **TED JOHNSON,** Plant Manager
Connecticut Chemicals (Canada) Ltd.

Problem: In the compounding and packaging of cosmetic solutions, methylene chloride and insecticide compounds at Connecticut Chemicals (Canada) Ltd., Toronto, Ontario, flexible hoses on filtration and compounding equipment and mixing tanks would not withstand the corrosive action of certain of these chemicals, and would also absorb odors and solutions.

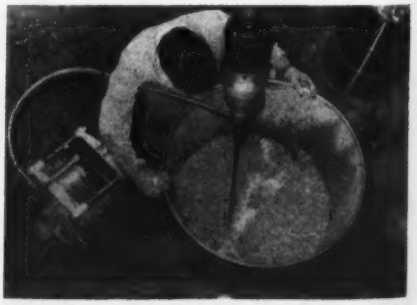
Connecticut Chemicals processes aerosols and handles a number of diverse chemicals, processing them over a wide temperature range. Extreme versatility is required in plant's production equipment.

Solution: Manufacturer replaced process hoses with flexible hoses made of Teflon. Hoses have an operating range of −100°F to +500°F, and are equipped with stainless steel hose fittings.

Results: The complete factory installation of hoses made of Teflon is as good as new after more than a year's usage. The lines are easily connected and disconnected for flushing when new compounds are mixed, and do not absorb chemical solutions. The fittings are detachable and reusable and permit hose assemblies to be made up on the job.

(2802 hoses of Teflon and "super gem" stainless steel fittings are products of Aeroquip Corporation, Jackson, Mich.)

Check 3578 opposite last page.



Here, hose made of Teflon is used to transfer cologne solution to stainless steel mixing tank. Hose absorbs no odors which might contaminate batches, can be cleaned easily between batches of different compounds

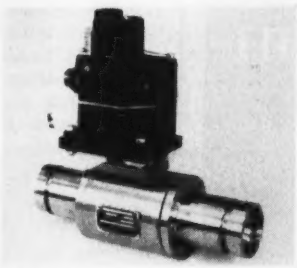
Stainless shut-off valve handles corrosives at − 320 to + 160°F

Features straight-thru flow design

Uses: For control of all fluids and gases, including highly corrosive fuels and oxidizers.

Features: Unit handles corrosive fluids and gases in cryogenic area, −320 to +160°F. Straight-thru flow design provides unobstructed, smooth, flow path for minimum pressure drop at all rates of flow.

Description: Pressure range handled by DC motor-driven,



Corrosive fluids and gases in cryogenic area are handled by all-stainless steel shut-off valve

all-stainless steel shut-off valve is 0 to 1000 psi. Unit has floating ball-seat valve arrangement with self-wiping and self-lapping action.

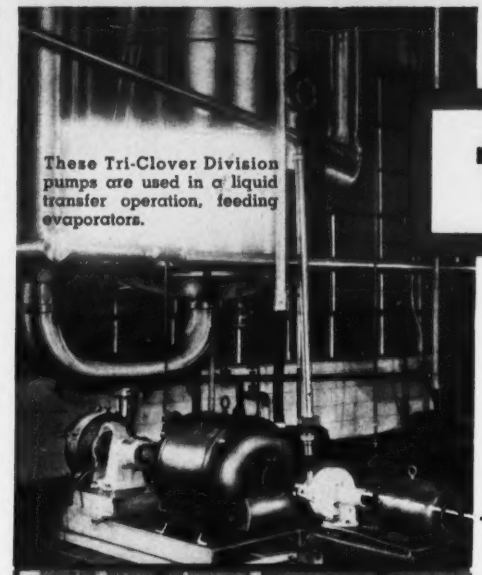
Valve is available with ports for socket weld connection, hose clamps, and standard AND or MS fittings. Sizes range from ¼ to 1″.

(Stainless steel shut-off valve is product of Hydromatics, Inc., Cedar Grove, N.J.)

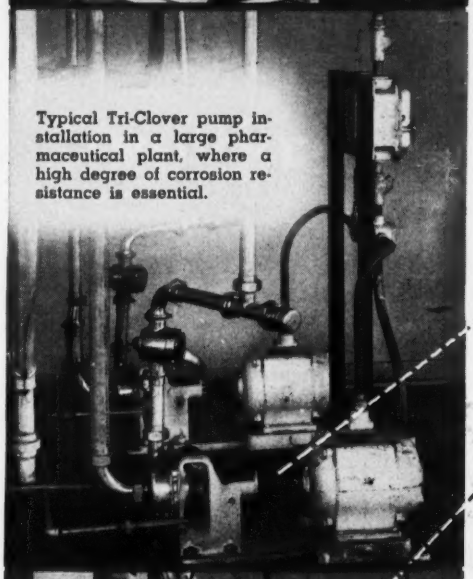
Check 3579 opposite last page.

PETROCHEMICAL NEWS AROUND THE WORLD

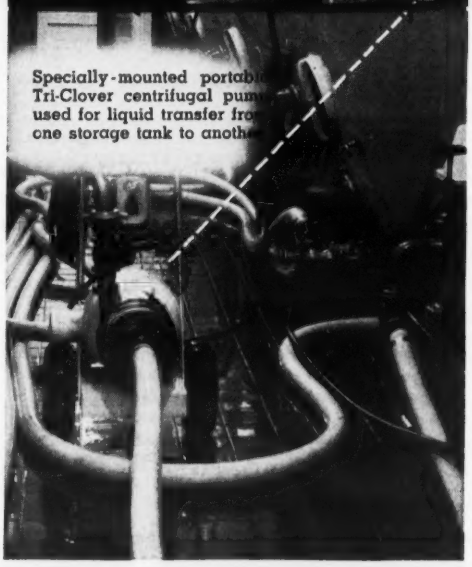
Since the remarkable petrochemical development is world-wide, the monthly petrochemical section starting in this month's CHEMICAL PROCESSING (page 87) will contain petrochemical news from a number of foreign countries.



These Tri-Clover Division pumps are used in a liquid transfer operation, feeding evaporators.



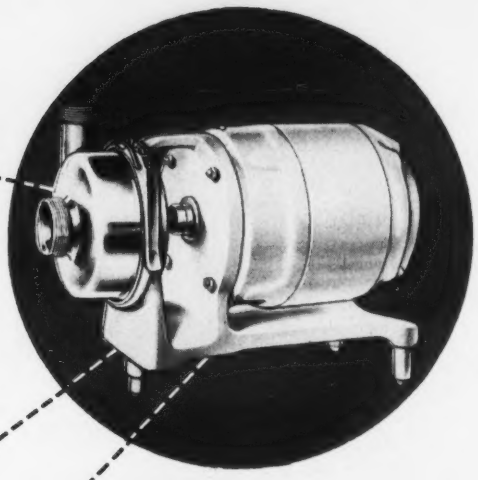
Typical Tri-Clover pump installation in a large pharmaceutical plant, where a high degree of corrosion resistance is essential.



Specially-mounted portable Tri-Clover centrifugal pump used for liquid transfer from one storage tank to another

TRI-CLOVER

CENTRIFUGAL PUMPS



. . an efficient solution to corrosion-resistant pumping problems

Available in stainless steel, nickel alloy, bronze and cast iron, Tri-Clover Division pumps are designed for efficient liquid transmission with high resistance to corrosion. These modern pumps offer many exclusive features, including patented screw type impellers with quick-acting impeller clips, lightweight heads with a minimum of parts, casing construction permitting fast, easy assembly or disassembly—and a wide choice of seals for various applications.

Tri-Clover's exclusive developments are the result of many years of specialized engineering experience and thorough knowledge of liquid handling. Let our engineering staff work with you in solving your pumping problems.

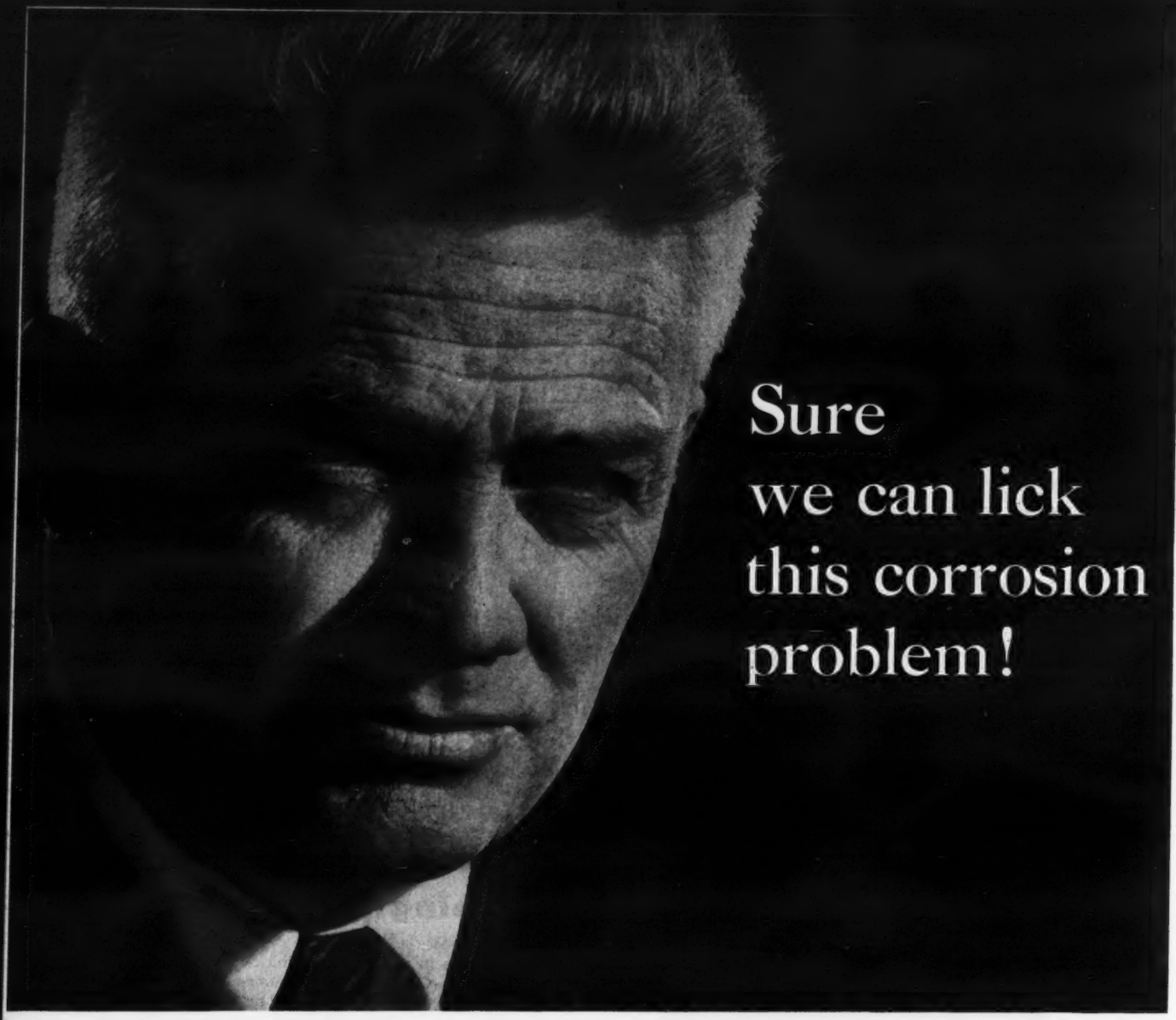
See your nearest Tri-Clover distributor, or write:

TRI-CLOVER

LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

EXPORT DEPT., 8 S. Michigan Ave., Chicago 3, USA Cable: *TRICLO*
In Canada: Brantford, Ontario

Check 3580 opposite last page.



try titanium now!

Now that there's a plentiful supply of titanium, all industry can benefit from its unique corrosion resistance. This property is combined with an unusually high strength-weight-ratio so that titanium works equally well in stationary and moving components, under vacuum or pressure.

But there may be even more compelling reasons for trying titanium now. Will its exceptional corrosion resistance mean new savings in maintenance? Will its ability to retain strength at high temperatures mean new production economies? Can titanium help you obtain increased product quality or yield?

There is only one way to ascertain what titanium can do for you. Try it now. You can't afford not to.

WHERE YOU CAN GET TITANIUM EQUIPMENT NOW!

Booklet tells where you can get titanium mill products and fabricated equipment. Also gives cost-saving service records in process industries.

Electromet
FERRO-ALLOYS AND METALS

UNION CARBIDE

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

ELECTRO METALLURGICAL COMPANY CP-2
Division of Union Carbide Corporation
30 East 42nd Street, New York 17, N. Y.

Please send me a copy of "New Heat on Titanium."

Name _____

Company _____

Address _____

THAT'S INTERESTING

Rubber Time

Eastman Kodak is rubberizing time, stretching and compressing it to suit processing needs. A thermistor plus appropriate electronic circuitry, changes current frequency to an electrical timing clock on the film developing line. If the temperature drops, resistance decreases and the frequency is reduced. Clock will run slower, lengthening developing time. If temp goes up, cycle reverses.

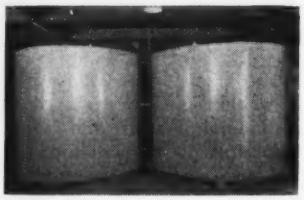
Styrene Shell

Plastic shells, the 105 howitzer variety, have had successful field testing by Naval Ordnance Labs. A shell case, not including projectile, weighs only 2.5 pounds when made of styrene. Standard brass case weighs 5.9 pounds. In addition, cost could be lower in mass production. Also, color schemes are possible with the plastic which may be used to designate the different rounds.

For more information on product at left, specify 3581 see information request blank opposite last page.

Maintenance-free 17 yr, rubber tanks' lining resists liquid alum

Rubber lining in tanks that store liquid alum is still in excellent condition after 17 years of almost constant service. Alum tanks, in use at Crystal Tissue Company plant, Middletown, Ohio, are open-top, and measure 10′ in diameter by 8′ high with 5/16″ shell. They are lined with 3/16″ thick rubber lining consisting of hard rubber layer between two layers of soft rubber. Special lap seam permits expansion and contraction of hard rubber. Instead of meeting, edges of hard rubber overlap and float in cushion of soft rubber. The lining can be vulcanized with steam or hot water at 212°F.



Maintenance-free for 17 years, rubber lining of alum storage tanks is expected to last indefinitely

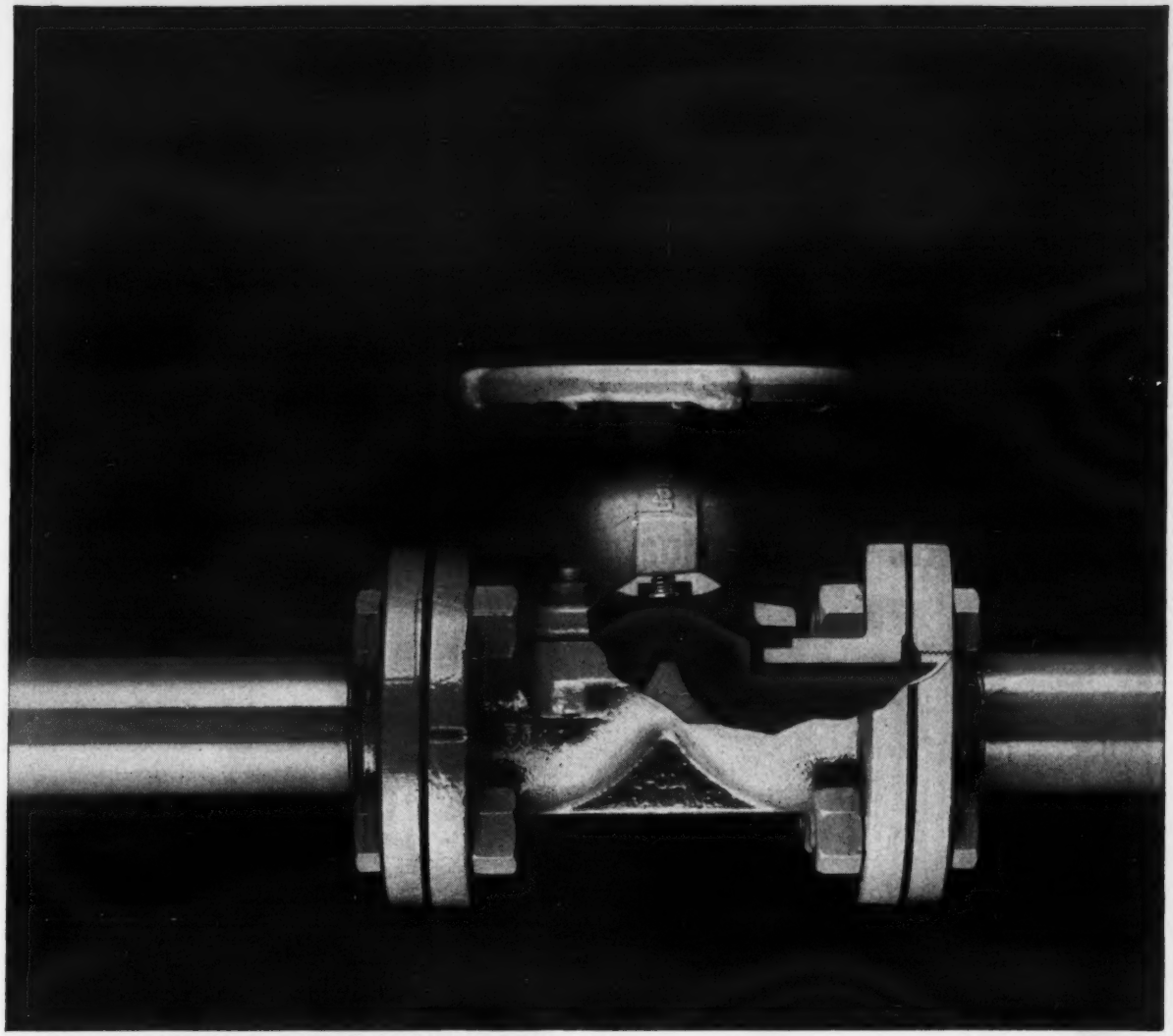
Except for cleaning, alum tanks have been in constant service since 1940. There have been no repairs on either rubber lining or metal parts of tank. The material is in excellent condition and should last indefinitely, says Crystal's plant superintendent.

("Triflex" lining is product of Industrial Products Div., B. F. Goodrich Co., 500 S. Main St., Akron, Ohio.)

Check 3582 opposite last page.

Fluorine polymer resin used to coat cables resist solvents

Successful results have been achieved by coating coaxial cable, used for interconnecting wiring between fuel sensing tank units and gages, with a fluorine polymer resin coating. The outer jacket of the coaxial



Corrosion protection is continuous in saran lined pipe—liquid never touches metal.

Here's why Saran lined pipe offers long range economy

It's rigid steel pipe . . . lined with corrosion-resistant saran . . . keeps shutdowns to a minimum for years

Looking ahead? Do your plans call for a complete corrosion-resistant piping system with a low total installation cost . . . a system that requires a minimum of maintenance . . . that's simple to modify . . . that can be fabricated in the field?

Then it will pay you in every way to look into the genuine economy of a complete system of saran lined pipe.

First, consider the natural advantages of the new gray saran lining itself. Its lower coefficient of thermal expansion and contraction more closely approaches that of steel. This provides a broader operating temperature range and greater resistance to thermal cycling. It can be installed in systems with operating pressures from full vacuum to 300 p.s.i. and temperatures up to 200° F. Add to these advantages the immediate availability of saran lined pipe, valves, pumps and fittings and you have an ideal piping system that can be installed without trouble, waiting or hidden costs.

If your plans call for lined tanks, you'll want the advantages of Saraloy® 898 tank lining added to your saran lined pipe system. Get the complete story on how it will pay you to install a complete saran and Saraloy 898 lined system. THE DOW CHEMICAL COMPANY, Midland, Michigan.

SARAN LINED PIPE COMPANY
DEPT. 2000B-1
2415 BURDETT AVENUE
FERNDALE 20, MICHIGAN

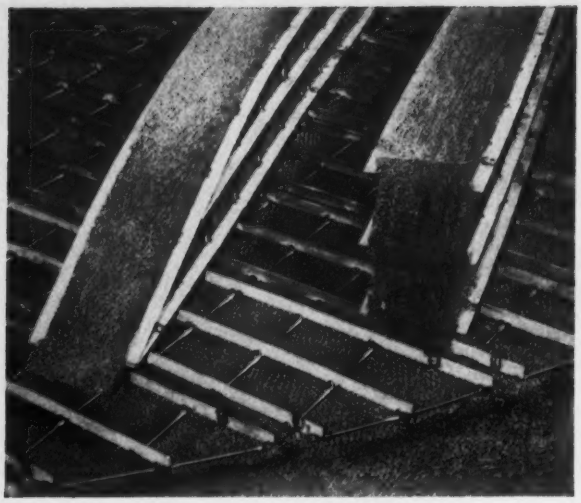
Please send me information on:
☐ Saran lined pipe, fittings and valves.
☐ Saran lined centrifugal pumps.
☐ Saraloy 898 chemical-resistant sheeting.

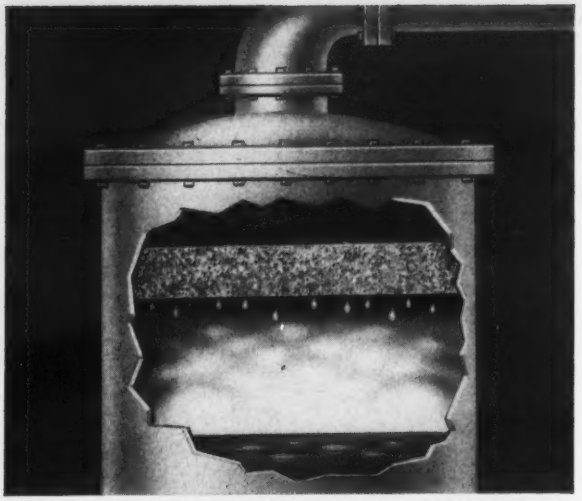
Name_____ Title_____ Company_____

Address_____ City_____ State_____

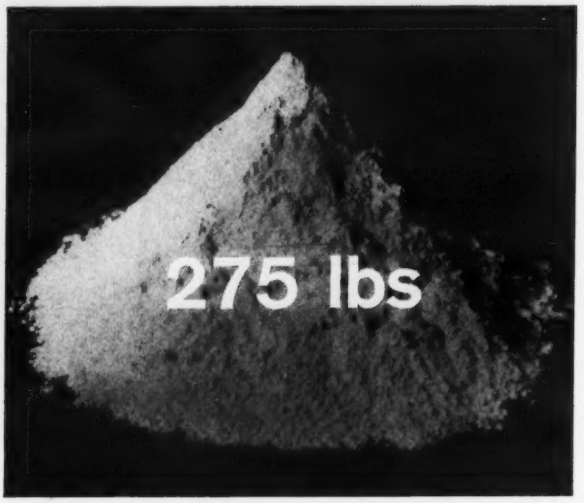
YOU CAN DEPEND ON DOW

Check 3583 opposite last page.





Nickel wire mist eliminator... in 8½-foot evaporator...



Stops corrosion of 30-inch vapor line... and saves $8 worth of NaOH per day

Costly carryover of corrosive liquids entrained in vapor can be stopped easily and economically with Nickel Alloy wire mist eliminators.

That was proved again very recently by the experience of Frontier Chemical Company, a Division of Union Chemical and Materials Corp.

Frontier concentrates some 50 tons per day of 50% NaOH in an 8½-foot evaporator. Caustic carryover from the evaporator was causing an $8 per day loss in product and expense of neutralization. The 30-inch vapor line was corroding badly, too, and expensive replacement was just around the corner.

Separators ruled out on costs

Frontier's engineers looked into several separator devices but the knitted Nickel wire mist eliminator shown above cost less than half as much. It requires no major change in the vessel and can be installed through the manhole. The pad provides about 100 square feet of droplet collection area per cubic foot but reduces free volume by less than 3%. The Nickel insures against corrosion and contamination problems.

Four trouble-free years

Frontier reports that the only maintenance required in four years has been a twice-weekly 30-minute backwash with water to remove solid particles.

Are you having trouble from carryover of corrosive chemicals? Write for a list of mist eliminator manufacturers.

The International Nickel Company, Inc.
67 Wall Street — New York 5, N. Y.

INCO TRADE MARK

INCO NICKEL ALLOYS

cable consists of a glass fiber braid.

This glass fiber braid is impregnated with fluorine polymer resin coating by a dispersion dip operation. Resin is then fused into a continuous film by passing cable through a high temperature baking tower.

Before coating cable, damage was caused by corrosive attacks of aviation fuels. Because of the flourine polymer coating's excellent chemical resistance to acids, alkalis, salts, and organic solvents, this problem has been eliminated.

(Fluorine polymer coating is available from Acme Resin Corporation, 1401 South Circle Ave., Forest Park, Ill.)

Check 3585 opposite last page.

Non-corroding fastenings

Price, stock, and delivery information on company's lines of stainless steel and nylon fastenings are contained in 138-page catalog designed to simplify work of engineers, buyers, and cost estimators. Fastening cat — Anti-Corrosive Metals Products Co., Inc., Castleton-on-Hudson, New York.

Check 3586 opposite last page.

"Take your problem to the shop foreman!"

Thanks to Tom Blakley, Florida East Coast Fertilizer Company, Homestead, Fla.

Rubber-plastic pipe in good shape after two years

Handles corrosive chemicals successfully

Chlorine, ferric sulfate, aluminum sulfate, and slaked lime, have been carried in rubber-plastic blend pipe for over two years with no signs of corrosion. In use at 100-million-gallon-per-day Elm Fork Water Purification Plant, Dallas, Texas, plastic pipe has proved less costly and easier to install than conventional pipe.

Having diameter of four inches, pipe was installed in 20-ft lengths, using sleeve-

Plastic pipe, carrying corrosive ferric sulfate, is easily installed

type fittings that were cemented in place. In some instances the plastic pipe was cut with a hacksaw to fit piping system. The conventional pipe it replaced, which had screw-type fittings, had to be made to exact length needed.

(Kralastic, rubber-plastic blend, is product of Naugatuck Chemical Div., United States Rubber Co., 1230 Avenue of the Americas, New York 20, New York.)

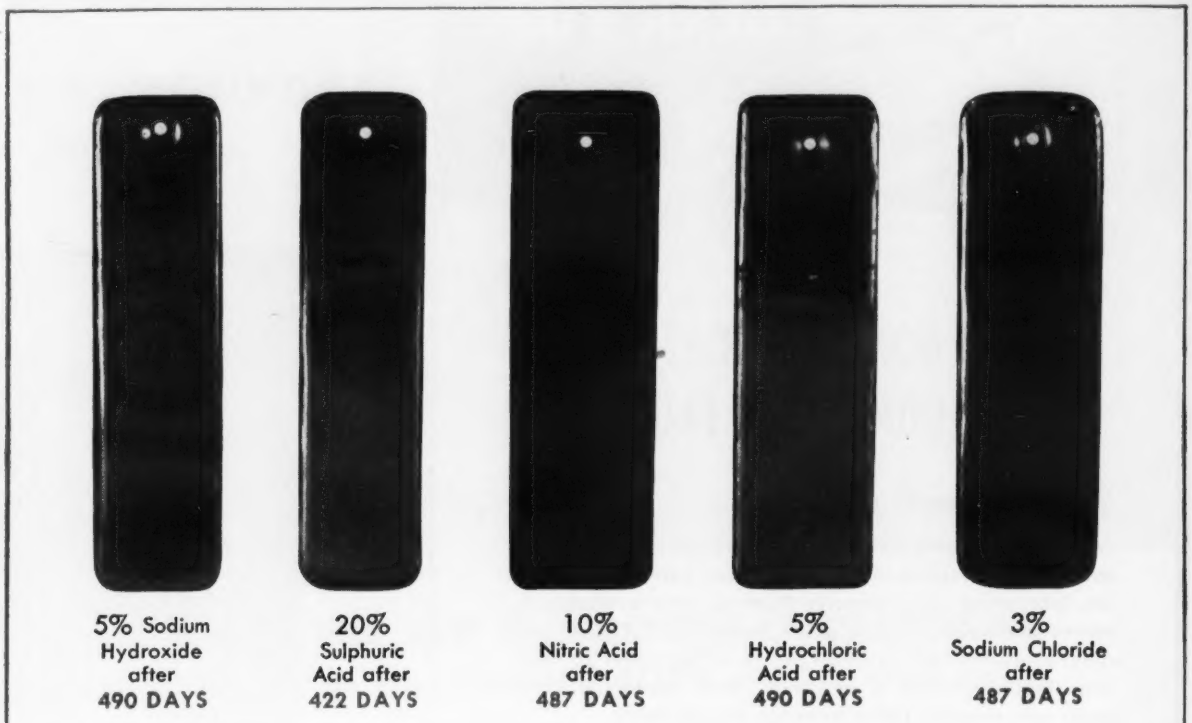
Check 3587 opposite last page.

Screw machine products

Typical screw machine work in a variety of tough alloys, including stainless steels, Inconel, nickel, and titanium is depicted in manufacturer's four-page illustrated bulletin. Screw machine products bul — Allmetal Screw Products Company, Inc., 821 Stewart Ave., Garden City, L. I., New York.

Check 3588 opposite last page.

Look for results like this when you test TARSET® immersion panels!


5% Sodium Hydroxide after 490 DAYS
20% Sulphuric Acid after 422 DAYS
10% Nitric Acid after 487 DAYS
5% Hydrochloric Acid after 490 DAYS
3% Sodium Chloride after 487 DAYS

THE unretouched photographs above tell their own dramatic story about the ability of Pitt Chem *Tarset* to resist chemical corrosion! In each case, the test panel was removed from the immersion vessel, rinsed under cold water, wiped lightly and photographed. Several of the panels exhibited slight staining. But *none* of the panels showed any perceptible effect of the reagents on the *Tarset* coating!

Tarset is the patented coal tar-epoxy resin coating backed by *three years of service experience.* Chances are it's the *one* coating that can solve many of your toughest chemical corrosion problems . . . at a relatively economical cost.

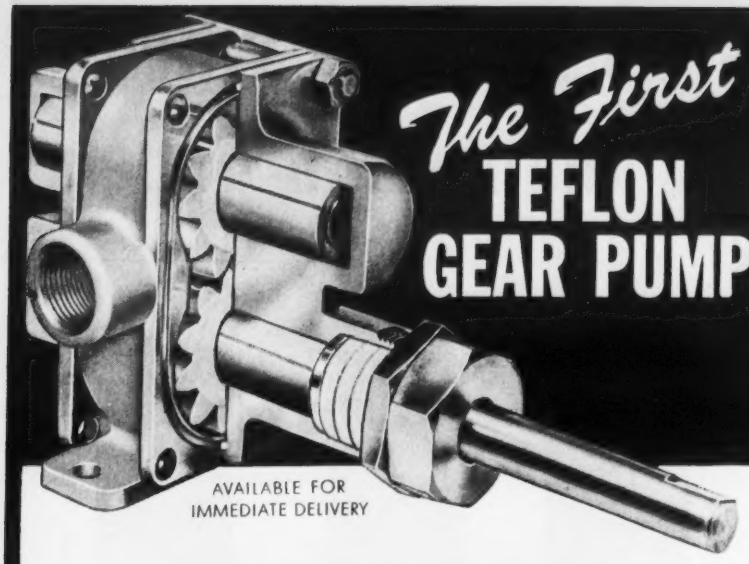
If you have a stubborn corrosion problem in your plant, we invite you to investigate *Tarset* today. We will be glad to send you immersion performance data . . . and any other technical information you may need.

PITTSBURGH COKE & CHEMICAL CO.

WSW 6771

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Check 3589 opposite last page.



The First TEFLON GEAR PUMP

AVAILABLE FOR IMMEDIATE DELIVERY

FOR NON-LUBRICATING AND CORROSIVE FLUIDS

You asked for it . . .

and Eco is the only manufacturer who has made it available. The first self-priming rotary gear pump suitable for non-lubricating and corrosive fluids is now available for immediate delivery. The pump, with ¾" P.T. inlet and outlet ports, features housings of 316 or Carpenter 20 stainless steel, Hastelloy C or nickel, with reinforced Teflon gears and internal Teflon bearings and packing.

Designated the GearChem,* this pump is suitable for speeds to 1750 rpm at capacities to 10 gpm and pressures to 100 psi. Viscous media to 5000 SSU can be pumped at reduced speeds.

The GearChem created tremendous interest at the recent Chemical Show. In addition to proportioning and metering applications the pump is ideal for general process work in pilot plant and production operations.

Write for prices and complete information.

* T.M. Applied For

Teflon—duPont trademark

ECO

the big name in small pumps

ENGINEERING CO.

12 NEW YORK AVE.

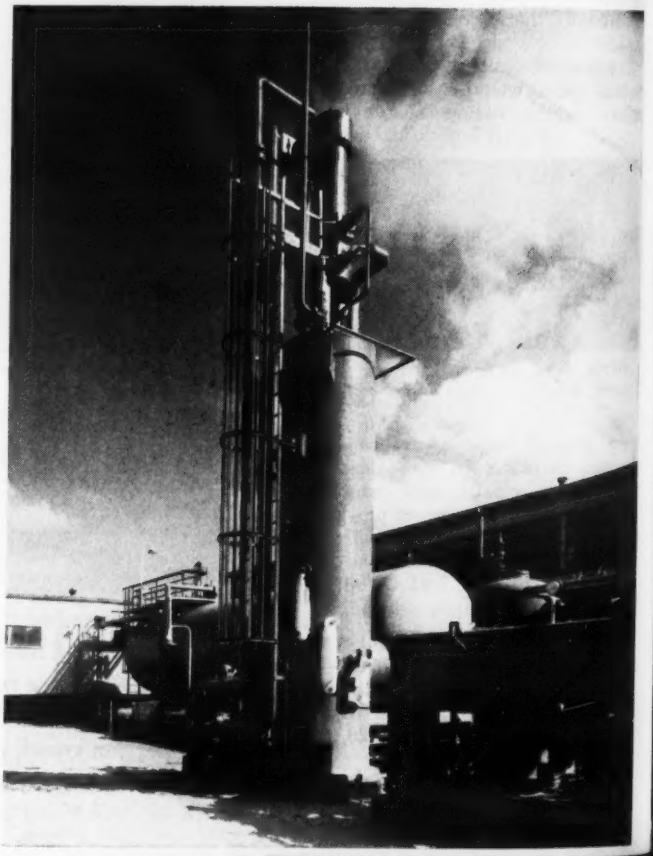
NEWARK, N. J.

MArket 4-6565

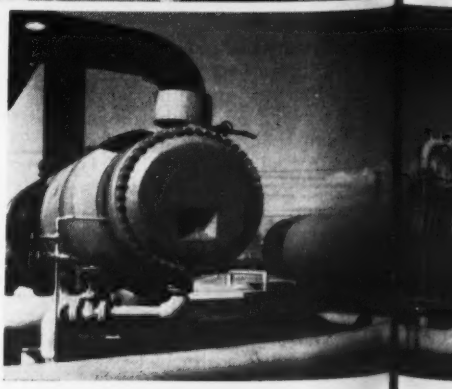
Check 3590 opposite last page.

In order to permit two-man operation of Liquid Carbonic's 60-ton-per-day CO_2 plant, maintenance had to be kept to a mimimum. To help, engineers selected an asphaltic coating which . . .

preserves insulation efficiency, cuts construction cost



Insulation on towers and storage tanks at Liquid Carbonic Corp., Oakland, Calif., is protected by cold-applied, moisture-proof coating. Only a single application was needed for ¼"-thick film



Insulation on heat exchangers and piping at 60 ton/day CO_2 plant retains its thermal efficiency because moisture-proof coating prevents liquid or vapor penetration

PROBLEM: Insulation on piping and equipment at Liquid Carbonic Corp.'s $1.5 million, Oakland, Calif., CO_2 plant had to be protected from moisture penetration. Designed for two men per shift operation, plant has approximately 80% of operating units located "in the yard," exposed to all wind and weather conditions.

To maintain thermal efficiency, three to six inches of cork and Fiberglas insulation are used. If moisture were permitted to penetrate, insulation would lose most of its effectiveness. Also, moisture seeping through to unprotected metal under insulation could be a source of serious corrosion.

Plant produces approximately 60 tons of CO_2 per day. Two-man crew is responsible for both operation and maintenance so all equipment and materials have to be dependable to keep maintenance time to a minimum.

Solution: When plant was erected in 1955, a cold-applied asphaltic mixture was used as a weather-proofing coating for insulation. Material is a factory-compounded asphaltic water emulsion combined with mineral fillers and fiber. It has a viscous consistency suitable for easy troweling.

Coating was applied to thickness of ¼" in a single application. Permeability rating is 0.0175 grains/sq ft/in Hg/hr for 0.10" dry film. Rate of application was 21 to 24 gal/100 sq ft.

To next page

BEN BUTLER (right), West Coast Production Manager, Borden Company Chemical Division. Left, Bernard Egan, Alaskan Copper & Brass Co., Cooper Alloy distributor for the Pacific Northwest.

BUTLER OF BORDEN CHEMICAL

tells why he buys COOPER ALLOY stainless steel valves

Q. Mr. Butler, why does Borden Company Chemical Division require stainless steel valves?

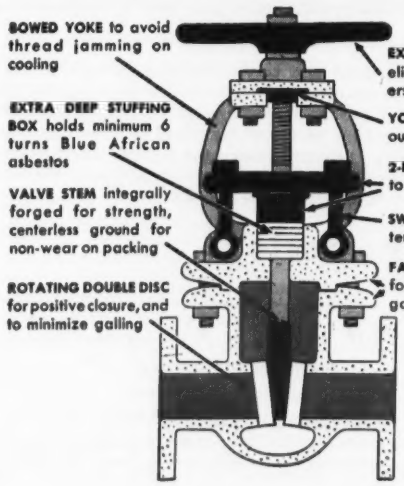
A. In the manufacture of formaldehyde, its derivative resins, and corresponding industrial adhesives only stainless steel can meet our rigid requirements for corrosion, contamination and heat resistance.

Q. What do you consider the most important factor in purchasing valves?

A. The truest measure of a valve is its operating performance. We have never received a complaint on Cooper Alloy valves from our engineers or operating personnel. The extra-large handwheel and unique valve design afford easy operation with positive opening and closing, minimizing maintenance and down time.

Q. What other factors count in choice of valve supplier?

A. Service. The large and complete Cooper Alloy stock at Alaskan Copper affords immediate delivery on stainless steel valves and fittings, as well as pipe. That's a big reason why we buy Cooper Alloy!


BOWED YOKE to avoid thread jamming on cooling
EXTRA DEEP STUFFING BOX holds minimum 6 turns Blue African asbestos
VALVE STEM integrally forged for strength, centerless ground for non-wear on packing
ROTATING DOUBLE DISC for positive closure, and to minimize galling
EXTRA LARGE HANDWHEEL to eliminate need for "persuaders"
YOKE NUT REPLACEABLE without valve disassembly
2-PC. GLAND CONSTRUCTION to prevent scoring of stem
SWINGING EYEBOLTS for maintenance convenience
FAIRED BODY-BONNET FLANGES for equal stress and uniform gasket loading

A VALVE DESIGNED FOR STAINLESS!

The Cooper Alloy valve is not an adaptation of earlier brass and iron patterns. Cooper Alloy, with over 35 years of experience in handling stainless steel, created a valve *designed to be cast in stainless!* **Check the Special Design Features shown at left.**

As the little CA man below is saying: *"You can tell a Cooper Alloy Valve as far as you can see it!"* Write today for *your* copy of our folder "Design Factors In Stainless Steel Valves." The Cooper Alloy distributor near you will be glad to show you the complete line of Cooper Alloy valves *and fittings*, and their advantages. He can serve you promptly from local stocks.

COOPER ALLOY

Corporation • Hillside, New Jersey

VALVE & FITTING DIVISION

THIRTY-FIVE YEARS OF STAINLESS STEEL PIONEERING

Check 3591 opposite last page.

BIG GUN IN STAINLESS

Stainless steel so effectively turns the battle against corrosion that there is no question about the investment payout. To assure long life, Type 304 ELC stainless was selected for this 90′ stripper column. Shop-fabricated by Graver in two sections and field-welded into one unit, the column was random-radiographed and tested to pressures of 162 psi. and 246 psi. Graver's expertness in fabricating and welding stainless is always assurance of trouble-free service.

to turn the battle against corrosion!

GRAVER ALLOY DIVISION

Building for the Future on a Century of Craftsmanship in Steels and Alloys

GRAVER TANK & MFG. CO., INC.
EAST CHICAGO, INDIANA
New York • Philadelphia • Edge Moor, Delaware • Pittsburgh
Detroit • Chicago • Tulsa • Sand Springs, Oklahoma • Houston
New Orleans • Los Angeles • Fontana, California • San Francisco

Check 3592 opposite last page.

From preceding page

Results: Asphaltic coating provides positive protection against moisture penetration. In addition, considerable time and expense were saved because of material's one-coat application characteristics. Engineers were able to eliminate excessive labor costs involved in scaffolding and ladder-travel normally encountered with multiple coat applications. Hard-to-reach piping and equipment, including 100′-high towers, were finished in one operation.

Maintenance has been negligible.

(Laykold Weathercoat protective coating is a product of American Bitumuls & Asphalt Co., 200 Bush St., San Francisco 20, Calif.)

Check 3593 opposite last page.

Tape coatings will be used on several thousand miles of pipe lines in 1958

Rapidly and easily applied, with less labor

Recent technical paper tells why plastic tape coatings are increasingly being used for protecting large-diameter pipe lines from corrosion. Greater material cost for tape coatings is offset by the economies in application that result with the use of tape. Service experience indicates that the use of tape provides a reliable, quality job that offers excellent protection to the pipe.

Both vinyl and polyethylene tapes are available. Pressure-sensitive polyethylene tape is the only type that has appeared in long line construction to date. In one case in which a 22″ line in the Midwest was coated, use of the polyethylene tape resulted in a labor savings of 45%. Only 40 men were used in place of the 73 that would have been required by conventional coating methods.

Up to 15,000′ per day was applied, the average footage over entire job being 9174′ per day. It is estimated that the use of tape enabled construc-

tion to proceed with an increased efficiency of about 30% — largely because the tape coating is ready to go when received at the job site.

In coating the 22" line, a considerable amount of equipment ordinarily used with conventional methods was not needed. Use of tape was found to be simpler and less hazardous. These are the reasons for the increased acceptance of tape coatings by industry. Several thousand miles of underground pipe will be protected this way during 1958.

(Condensed from technical paper, "Tape Coatings in Pipe Line Construction," which was presented at the North Central Regional Conference of the National Association of Corrosion Engineers, held in Chicago in October 1957. Paper was prepared by Dr. Howard D. Segool, Merchandise Mgr., Polyken Sales Div., The Kendall Company, 309 W. Jackson Blvd., Chicago 6, Illinois.)

Check 3594 opposite last page.

Metals for painting cleaned, prepared in one step

Uses: For cleaning and preparing metals for painting.

Features: Cleaner removes rust and mill oil in single step. It also retards corrosion and oxidation, and establishes a new-type phosphate coating, to which paint, enamel, lacquer, and plating will securely adhere.

Description: Improved modification of phosphating cleaner is applicable as an immersion dip, a brush-on wipe-off operation, or as a spray. It is characterized by good rinsibility, and is claimed to impart a superior impact resistance to coatings.

Ferrous metals, zinc-base die castings, galvanized iron, aluminum, copper, and brass can all be cleaned and phosphated with same solution.

(Chem-Bond is product of Bell-Ray Chemical Corporation, 3132 W. Garfield Ave., Milwaukee 8, Wis.)

Check 3595 opposite last page.

One of a series.

Some Things to Think About Steam Traps

. . . in order to get high operating efficiency and a minimum of maintenance

The gentleman who invented the wheel had a basic idea and so far no one has come up with anything better for the purpose.

If you'll pardon us for a little overemphasis on the significance of steam traps, we'd like to liken one of them to the wheel.

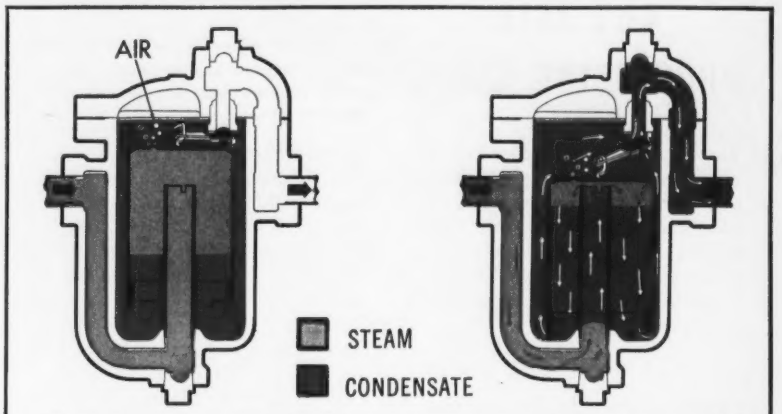
In 1911, when the first Armstrong inverted bucket steam trap model was announced to the world, or at least that part of the world that modest advertising and sales budgets would cover, it was not received with equal enthusiasm by all (especially old-style trap makers). But, like the wheel, it managed to find its way into general use. And, nothing better has ever turned up for the purpose of draining condensate. As a matter of fact, the Armstrong trap has been very widely copied. Today, there are more inverted bucket traps draining process equipment than any other kind. Of these, there are more Armstrongs.

If this sounds like the boasting of a proud parent, give consideration to some fundamental requirements not met by all traps:

1. ***A steam trap should not leak steam.*** Some traps do, you know, because of the nature of their operating principle. No steam ever gets to the Armstrong trap orifice. The valve is always water sealed.

2. ***A steam trap should vent "air" as fast as it accumulates***—otherwise temperatures are reduced and corrosion is a problem. The Armstrong trap handles air very nicely. The vent in the bucket permits air to accumulate in the top of the trap, from where it is discharged when the trap opens. For extreme conditions like draining paper machine dryers, some jacketed kettles and certain other units, the vent is sized larger for the job. And, for handling big volumes of air during warm-up, a bucket with an auxiliary thermic vent really speeds up heating.

3. ***A steam trap should discharge condensate at steam temperature*** if you want to get maximum efficiency from the unit drained. And most people certainly do. If you have to wait for the condensate to cool, it's almost impossible to maintain maximum temperatures and prevent air build-up. You guessed it—the Armstrong trap opens for water, without dependence on temperature.



Trap closed. Steam has floated inverted bucket; valve is held tightly closed by system pressure. Air entering trap passes through bucket vent and accumulates at top of trap.

Trap open. Condensate entering trap has caused bucket to lose buoyancy. Weight of bucket times leverage pulls valve open. Air is discharged along with condensate.

4. ***A steam trap should be suitable for any return system.*** The Armstrong trap works just the same whether discharging to atmosphere, back pressure or vacuum. It has been conclusively proved that flash steam resulting from use of a bucket trap does not cause a problem in vacuum return systems. The flash condenses rapidly. It's the leaky traps that cause the headaches.

5. ***A steam trap should not be a "prima donna".*** Some kinds of traps take an awful lot of care and coddling. The Armstrong trap is a rough and ready type with a hardened chrome steel constitution (valve and seat, to be exact). It cleans itself of ordinary dirt and scale without choking up. Its 18-8 stainless parts stave off rust and corrosion. It resists wire-drawing and wear remarkably well. In fact, it stays on the job longer with less attention than any trap ever produced. Unless you live in Siberia, you can probably find a user around the corner who will tell you so from experience.

6. ***A trap should not be an "orphan".*** With Armstrong traps you can *always* get prompt service and parts from nearby Factory Representatives and stocking distributors as well as from the factory.

7. ***A trap should have a guarantee.*** The Armstrong trap is unconditionally guaranteed to give you *complete satisfaction* (as to doing its job, that is). If it doesn't, you can get your money back.

If you'd like to buy some of these excellent steam traps, call your local Armstrong Representative or write. **Armstrong Machine Works, 8802 Maple St., Three Rivers, Michigan.**

ASK FOR the 44-page Steam Trap Book, free on request without obligation.

ARMSTRONG STEAM TRAPS

Check 3596 opposite last page.

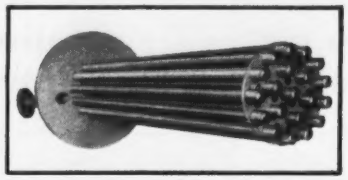
Fansteel

Corrosionomics

REGISTERED U. S. PATENT OFFICE

A JOURNAL OF USEFUL INFORMATION FOR THE SOLUTION OF CORROSION PROBLEMS

TANTALUM BAYONET HEATERS CUT ACID PROCESSING COSTS



Fansteel tantalum bayonet heaters come in a wide variety of sizes and shapes to fit the most critical need.

Tantalum bayonet heaters are the most economical heating units obtainable for extremely corrosive acid solutions (except hydrofluoric and fuming sulfuric). This can be proved on a cost reduction basis if all the factors of highly corrosive service are carefully considered.

Acid Proof—Long Life

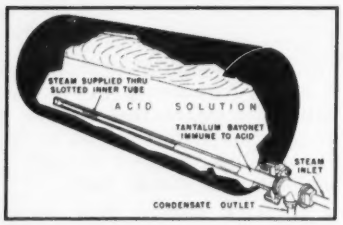
Fansteel tantalum bayonet heaters are ideally suited to acid processing requirements for several reasons. First, the pure metal is not subject to thermal shock. It is acidproof, not just acid-resistant—which makes product contamination impossible. Fansteel tantalum also has high tensile strength, compressibility, impact strength and ductility. Since no corrosion allowance need be made, only the thickness required for structural strength need be used.

High Processing Rates

Acid processing rates are very high with Fansteel tantalum heaters. The special design permits rapid removal of condensate on the steam side, promotes high velocities of both steam and condensate, and keeps the condensate film at minimum thickness. The heaters are never flooded and air can be discharged readily with the condensate. Added to this is tantalum's high rate of heat transfer which further speeds processing. Overall coefficients of 500 to 1200 are commonly obtained.

Overall Economy

These characteristics combine to make tantalum the ideal material for use in critical pieces of equipment such as heaters. The initial cost is more than justified by long, trouble-free service, simplicity of design made possible in associated equipment, and even upgrading equipment with heaters made from other materials. Heating capacities and standard sizes of Fansteel single-tube, bayonet heaters are shown in our Bulletin 3.506. They are also listed in the Chemical Engineering Catalog, page 750.



For vessels with side or bottom openings, the bayonet heater is an effective unit (single or multiple tube). Steam enters through the inner steel pipe, escapes through slots near the end and heats the tantalum tube.

Free Tantalum Test Kit

A corrosion test kit, available without charge to research technicians, if requested on your letterhead; contains both tantalum sheet and wire.

Free Technical Information

The above condensation is typical of the articles which appear in CORROSIONOMICS, a Fansteel publication. Mail us your name for inclusion on our free mailing list.

G581A

For further data on the above, write:

FANSTEEL METALLURGICAL CORPORATION
CHEMICAL EQUIPMENT DIVISION
NORTH CHICAGO, ILLINOIS, U. S. A.

Check 3597 opposite last page.

CORROSION

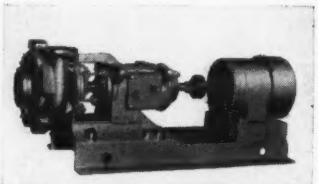
Rugged centrifugal pumps for abrasives, corrosives easily serviced

Fitted with wearing parts to suit particular use

Uses: For handling abrasive mixtures and slurries, and corrosive and hot liquids. Units can be stationed either above or below sump liquid level.

Features: Water-end or casing can be readily rotated to any one of four positions, providing discharge of pumped material in any one of four directions. Slippage seal adjustment takes only moments using common wrench. Adjustment can be made even when pump is in operation. Packing gland is also readily accessible and adjustments can be easily made. Oil or grease lubrication is optional. If nuts can not be readily loosened, they can be burned out with torch without damage to the pump.

Description: Single-stage, end-suction, centrifugal pump is available in sizes from 1 to 16″ for heads in some cases up to 250 ft or more, and capacities to 10,000 gpm. Three types of water ends are available to meet specific needs: for handling abrasive mixtures where head is limited; with split bearing stand for purely corrosive applications; and for either abrasive or corrosive applications where high pressures are developed during pumping.



Slippage seal adjustment in centrifugal pump for corrosive service takes only moments, can even be made when pump is in operation

(Series "H" centrifugal pumps are available from Nagle Pumps, Inc., 1249 Center Ave., Chicago Heights, Ill.)

Check 3598 opposite last page.

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Then fill out the slip and mail it to Reader Service Department. We will contact the manufacturer for you.

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to fill in the slip with the other pertinent information: your name, title, company, product made, and address.

For more information on product at right, specify 3600 see information request blank opposite last page.

These Stainless Steel bran shakers won't corrode, and they'll last years longer than equipment made of other, less durable materials. Because Stainless Steel is so strong, the new units at Staley's can be made thinner and lighter than comparable equipment made from other materials.

Sulfur dioxide doesn't harm Stainless Steel

at A. E. Staley Manufacturing Company, Decatur, Illinois

Staley's grinds and processes more than 60,000 bushels of corn daily in a continuous-flow operation that demands unfailing performance from every piece of equipment along the line.

And the equipment must be clean, for this corn is made into foods and nutrients. Corn starch, oil and syrup for the food industry must not only be chemically pure, but must be produced with food-grade cleanliness.

That's why company officials, constantly alert for any possible improvement or avoidance of trouble or contamination, were so pleased to find that Stainless Steel solved their sulfur dioxide corrosion problems. Previously the best selection of piping did show corrosion and the sulfur dioxide even attacked tanks of nonmetallic material causing porosity, cracks and corroded equipment. This increased both maintenance and control costs in producing satisfactory products.

Staley's standards called for pipes and tanks that would stay smooth and clean, impervious to the sulfur dioxide. That's why they replaced the outmoded piping and tanks with Stainless Steel.

"Stainless is *the* material for us," says Mills L. Calvert, Staley senior project engineer. "With stainless piping and tanks, I don't have to worry about corrosion or breakdown."

When you replace equipment in your plant, think about strong, corrosion-resistant Stainless Steel. And if you want service-tested quality, specify USS Stainless Steel. For fast delivery, call your local steel distributor.

USS STAINLESS STEEL

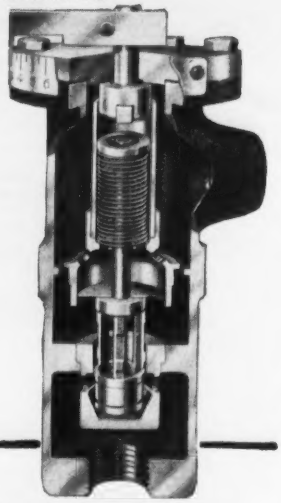
UNITED STATES STEEL

Need Adjustable-Constant Flow Rates?

DON'T Build a System...

Install a

Kates*

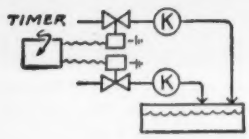


* KATES Direct-Acting Flow Rate Regulators are complete in themselves, requiring no outside connections except inlet-outlet piping; for light slurries, clear liquids, and many suspensions; hold constant flow despite 125-psi jumps or drops in inlet-to-outlet pressure.

Economy may not be your principal reason for selecting a Kates regulator, but added to the single-unit compactness and no-hunt, no-lag features it is certainly a valued extra. And you will save on maintenance, too. Kates regulators are designed to eliminate wire-drawing, and the only packing is on the infrequently-used dial stem.

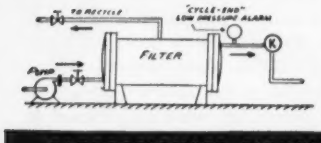
Write us for more details on the unique operating principles and practical design features of Kates flow rate regulators. But first, here are some of the problems that Kates has solved for others—*economically.*

BATCH PROCESS MEASUREMENT



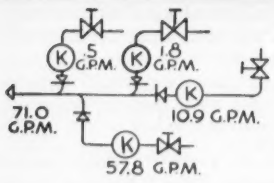
Automatic batch processes are easy when liquid ingredients are fed through Kates regulators and timer-operated solenoid valves. One timer can control all additives since individual flow *rates* can be set at each regulator. And it is easy to change proportions; just change the regulator settings.

PRESSURE FILTRATION CONTROL



As filter cake builds up, a constant valve-jockeying is needed to smooth out flow. A Kates control in the effluent compensates for rising pressure drop, keeps filter at best rating.

PROPORTIONATE BLENDING CONTROL



Where many ingredients go into one blend, and must be in exact proportion, a control *system* for each ingredient would cost plenty. But a Kates control on each feed does the job inexpensively, and each unit can be reset for a blend change.

Write for Technical Bulletin — TODAY

Kates

W. A. KATES COMPANY
Department D.
430 Waukegan Rd.
Deerfield, Illinois

Check 3601 opposite last page.

Latest in-process analytical tool runs complete analyses in one to twenty minutes by gas chromatography. Instrument will handle as many as four identical streams, with eight different components . . .

gas chromatograph analyzer can be operated continuously for months at a time

Uses: As process analytical tool for continuous batch analysis of stream components so vital in chemical processing operations, petroleum refining, fermenting, ammonia processing, and a host of others. Advantage of instrument is that as many as thirty separate analyses can be made of process streams, assuming four identical streams with eight different components.

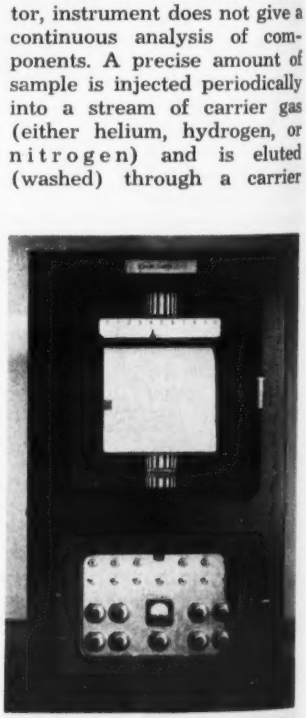
Designed for analyzing light hydrocarbon gases methane through hexane, instrument is not limited to these. Gases such as argon, nitrogen, ammonia, carbon dioxide, olefins, chlorine, and oxygen may be resolved and measured.

Features: Big advantage of the instrument is that it has been designed for heavy in-plant use, to make repeated analyses . . . accurately and continuously . . . for months at a time.

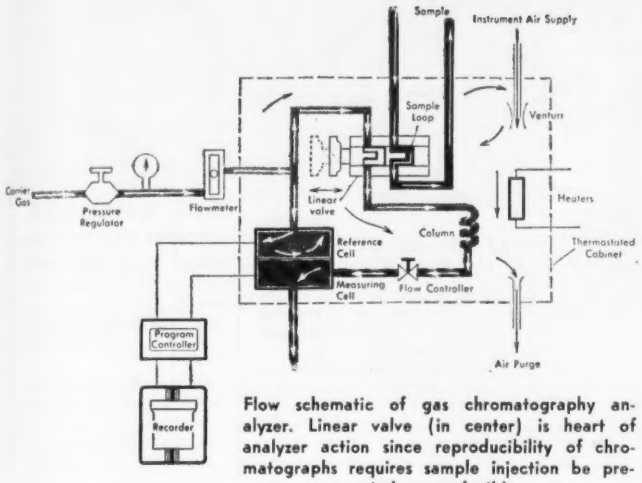
Complete analyses are made readily, requiring only one to twenty minutes, depending upon properties of components and difficulty of separation.

Description: Equipment is simple. It consists only of three basic units: the analyzer, a recorder, and a program unit. In analyzer unit are sampling valve, flow and temperature controls, column and detectors. Program unit contains timers, switches, and potentiometers for continuous output attentuation and detector power supply. In recorder are the detector-balance rheostat and chart advance mechanism.

Actually operating as a continuous batchwise determinator, instrument does not give a continuous analysis of components. A precise amount of sample is injected periodically into a stream of carrier gas (either helium, hydrogen, or nitrogen) and is eluted (washed) through a carrier



Recorder and programming unit (at bottom) of gas chromatography analyzer. Results of analysis appear on recorder as bar charts or spectrums



Flow schematic of gas chromatography analyzer. Linear valve (in center) is heart of analyzer action since reproducibility of chromatographs requires sample injection be precisely reproducible

column packed with an adsorbent.

Separation is based on fact that different components have a different degree of affinity for column packing. Thus, they resist force of carrier gas to wash them through the column in different degrees. A component is identified qualitatively by retention time, or time lapse from a sample injection until component appears at detector. Quantitative measurement is made by determining change in thermal conductivity of mixture of component and carrier gas. Helium is frequently used as it has a high thermal conductivity and is non-explosive.

How does it work?

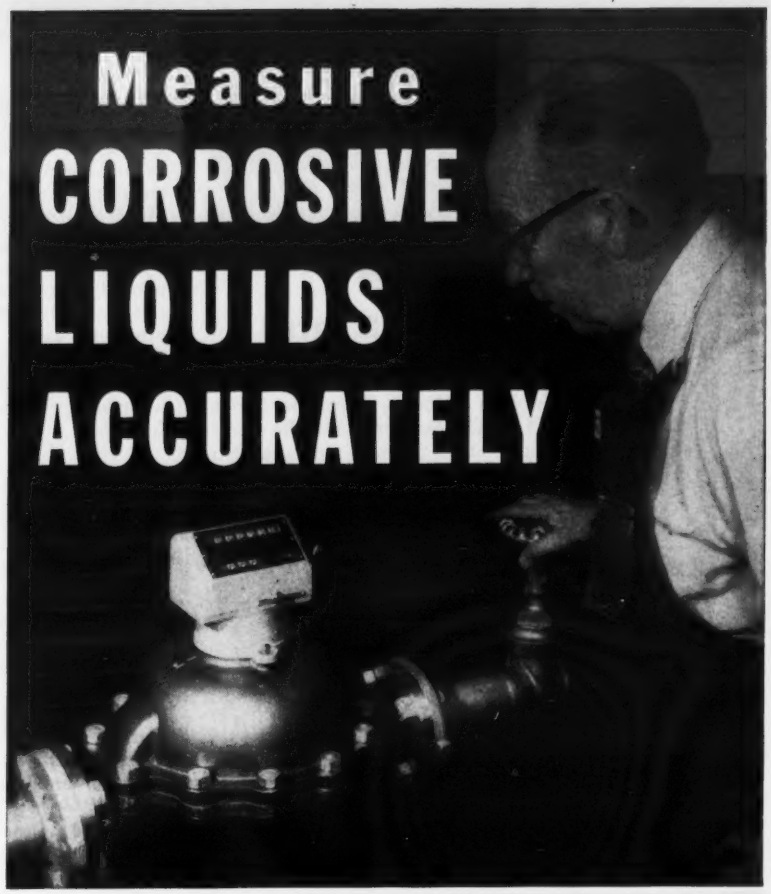
Heart of the analyzer is linear sampling valve which precisely controls flow of carrier and sample gases without changing flow rate of either. Valve is a single-action, pneumatically-operated piston in a cylinder block. Within valve block are two direct-pass measuring cells in series and a diffusion-type reference cell. Valve is actuated only long enough, usually thirty seconds, to advance a trapped sample volume into separation column.

Immediately sample is introduced into column, process of elution begins. Carrier gas, entering analyzer at rate of 80 cc/min, washes trapped sample through column. Components in streams separate in column and appear as measurable binary mixtures, carrier and component gases.

As eluted mixtures appear at detectors, differences in current between measuring and reference cells unbalance a DC Wheatstone bridge. Signal generated is then reduced in magnitude and appears on recorder as either a spectrum or bar chart.

Any limitations?

What are the limitations of the instrument? Obviously, it cannot be used for any material which is not a gas within temperature range of analyzer—50°C to 120°C. Accuracy of the system also cannot be better than accuracy of analysis of calibration gas. And, in actual use, column requirements are quite stringent. Since degree of separation depends on length and temperature, an increase in length sharpens the separation and makes the component peaks more distinct. However, increased column length causes a dilution of the component in the carrier gas. Column must therefore be long enough to



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Flow g.p.m..... Temp.....°F
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Company.....
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PRINCO laboratory thermometers are your assurance of everlasting legibility, easier readability and greater accuracy—for their STAZON markings will withstand the action of acids, caustics, and solvents, or any liquid which will not harm glass.

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Check 3604 opposite last page.

effect separation but not long enough to result in an unduly long cycle or weak signal.

Yet, despite the limitations, instrument can be quite useful. It will successfully measure varying concentrations over a wide range. One component may vary over the range of 40 to 90% while another in same stream varies from 0 to 5%. Both components will be measured with an accuracy of better than 2% of full scale.

Temperature control

Housed in an explosion-proof aluminum case, analyzer is temperature-controlled to within ±0.1°C in the presence of ambient temperature swings as great as ±30°F. Heater air flows into analyzer through a venturi at rate of one cubic foot per minute. Forced flow of air into analyzer thus obviates need for blowers and also purges the unit.

Operational needs

Stringent control of sample gas is not necessary. It should be provided at a flow rate of 0.1 to 1 cu ft/hr at a pressure of 3" water. Necessary carrier gas supply is provided by cylinders. Source of 20 psig instrument air should be available for air-purging analyzer housing and activating sample valve. Instrument operates on 120 volt 60 cycle power.

(Chromomax gas chromatography analyzer is product of Leeds & Northrup Company, 4907 Stenton Ave., Philadelphia 44, Pa.)

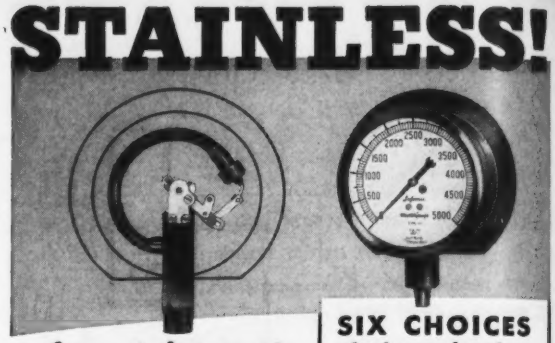
Check 3605 opposite last page.

Tank weighing system

Concept of tank weighing as a measurement of tank contents is described in detail in four-page bulletin. Use of manufacturer's hydraulic load cell as load sensing device in weighing system is discussed. Bul 571 — The A. H Emery Company, Pine St., New Canaan, Conn.

Check 3606 opposite last page.

STAINLESS!



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Now the superlative Mastergauge is available in a wider range of corrosion resistant tubes and sockets than any other pressure gauge.

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Marsh alone combines the "Conoweld" construction, the copper-clad "Marshalloy" case, the finer Mastergauge movement, the Marsh "Recalibrator", the new "Safecase." Ask for data covering your specific needs.

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of tubes and sockets

4130 alloy steel tube with alloy steel tip and socket.
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MARSH "THE STANDARD OF ACCURACY"

Check 3607 opposite last page.

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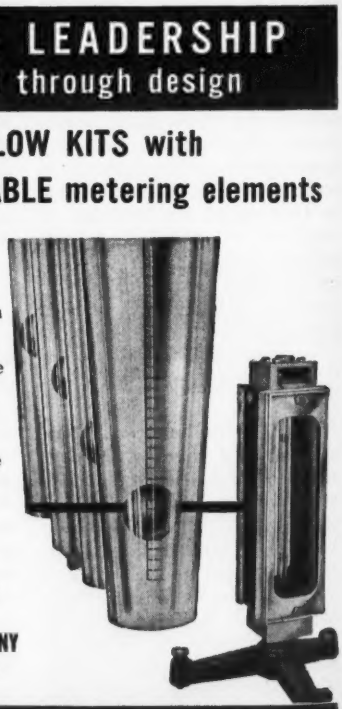
ROTAMETER FLOW KITS with INTERCHANGEABLE metering elements

Guaranteed interchangeability makes Brooks Rotameter Flow Kits a valuable tool for all laboratories and pilot plants. Interchangeable metering tubes and floats permit any laboratory to build up a reliable file of calibration data and use them to extrapolate for new flow rates of different gravities, pressures, and temperatures without recalibration. Write for your copy of Bulletin 140.



BROOKS ROTAMETER COMPANY
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A complete line
BROOKS ROTAMETERS
. . . for every service

Check 3608 opposite last page.

Small level switch adapts to almost any container

Uses: As topping or low-level alarm device. Can be installed in almost any container, tank, or vessel.

Features: Float of level switch is foam buna-N rubber to resist effect of most oily materials.

Description: Level-indicating switch consists of float riding on a short, metallic stem. Switch mechanism, hermetically sealed in glass, is explosion proof and corrosion resistant. Operation is independent of pressure or vacuum. Switch has magnetic snap-action for positive make and break.

Switch action can be reversed by reversing float of level switch

Switch is convertible from normally-open to normally-closed by reversing float on stem. Instrument operates on either AC or DC.

(Model 1800 switch is product of the Gems Company, Newington, Connecticut.)

Check 3609 opposite last page.

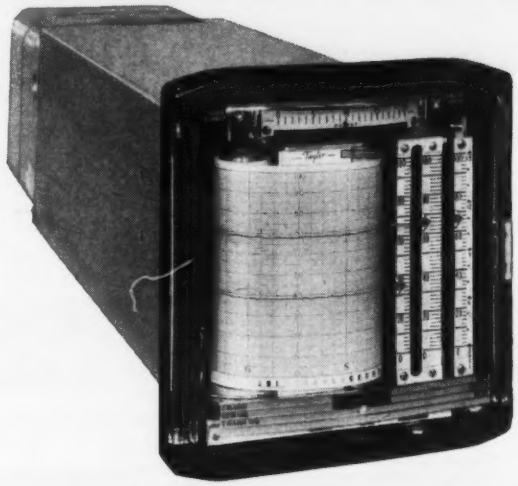
Color code chart

Durable, 8½ x 11" chart contains color codes and calibration symbols for thermocouples and thermocouple extension wires, plus pyrometer wire resistance figures. Color code and calibration chart — Thermo Electric Company, Inc., Saddle Brook, N. J.

Check 3610 opposite last page.

New Taylor TRANSCOPE Recorder brings you*

REVOLUTIONARY ACCURACY AND BIG-INSTRUMENT FEATURES



"No other recorder, regardless of size, puts so many features in so little panel space."

Front of Panel Control Settings let you make adjustments easier, quicker, and better . . . *from the front of the panel* . . . while recording! You can clearly see what you are doing, and the results, because the record is continuous.

Stays on Automatic Control while the recorder is removed for inspection. The unique Set Point Transmitter remains plugged in the case, providing continuous fully automatic control.

Complete Indicating Control Station while recorder is removed. You see the variable. There's no need to shut down the process for instrument service or adjustments. Horizontal gage at top of recorder will show either process variable or air output to valve, as desired.

Receives Three Variables to be recorded or indicated; has a Set Point Transmitter, an Automatic-to-Manual switching lever, a Cascade or process-output indicator, and many other features . . . all in a compact case.

"SERVOMATIC" Motor assures lifetime accuracy of pen position. Transmitter signal is received and amplified by individual force-balance servomechanisms. Spring feedback and powerful pneumatic motor give 150 times greater power than normally available for pen positioning.

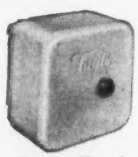
0.1% Threshold Sensitivity—a new standard of accuracy. Responsiveness to transmitter output is 0.1%, and because of the very small pneumatic displacement of the input capsule, is practically instantaneous.

Optional Alarms. Each SERVOMATIC motor can operate either an electric or pneumatic alarm. Each alarm can be adjusted for one high and one low, or two high or two low operating points.

For further information about this revolutionary new recorder, see your Taylor Field Engineer, or write for **Form No. 98282.** Taylor Instrument Companies, Rochester 1, N. Y., or Toronto, Ontario.

*Trade-Mark

MADE FOR EACH OTHER!



The Taylor TRANSCOPE Controller and Recorder are companion instruments. Together they give you new standards of process control performance . . unprecedented accuracy and adaptability. Ideal for the time constants of modern processing, exceptionally fast and responsive to adjustments, the TRANSCOPE Controller is also highly adaptable and simple to maintain. Write for **Bulletin 98278.**

Taylor Instruments
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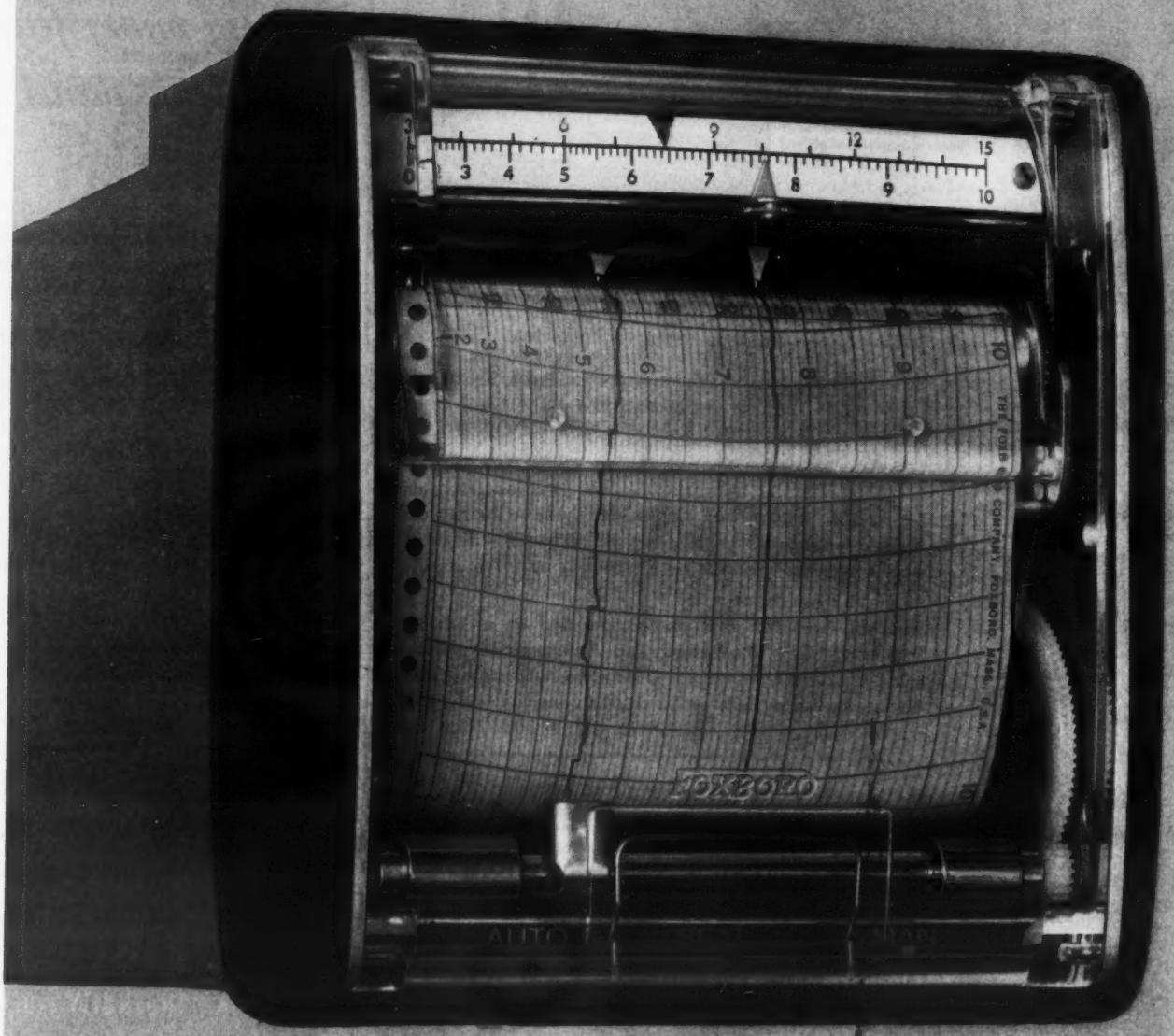
ACCURACY FIRST
VISION · INGENUITY · DEPENDABILITY

Check 3611 opposite last page.

FOXBORO
adds new convenience features to CONSOTROL* Recording Control Stations



Shown actual size

*Reg. U. S. Pat. Off.

– further "operating ease" combined with accuracy – readability – top performance

3-pen recording, angle mounting, indicating tear-off bar . . . just a few of the new convenience features you'll find in Foxboro Consotrol Recorders and Recording Control Stations.

But these new operating benefits are only part of the story. Additional control functions are handled easily with Consotrol Instruments. Auto-Selector control — the control of related variables through a common valve is now possible with Consotrol small-case panel instrumentation, as is centralized control of batch processes.

With their new, exclusive operating conveniences and process control functions, Foxboro Consotrol Recording Control Stations, now, more than ever, provide you with superior centralized recording and control. You'll find they maintain the highest standards of precision and dependability — are the simplest to maintain.

Write Foxboro for full details. Ask for Bulletin 13-18A. The Foxboro Company, 812 Neponset Ave., Foxboro, Mass., U.S.A.

FOXBORO

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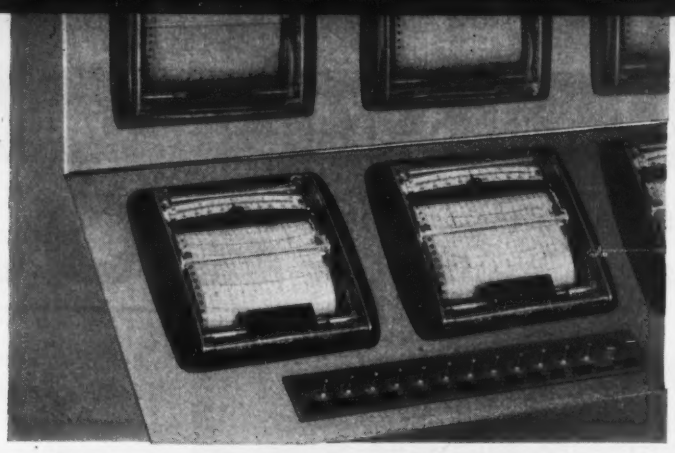
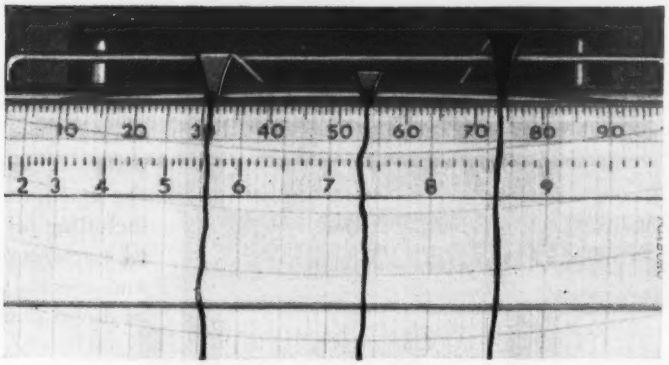
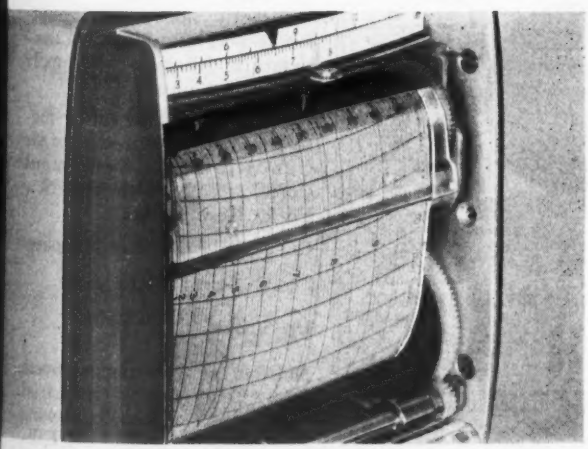


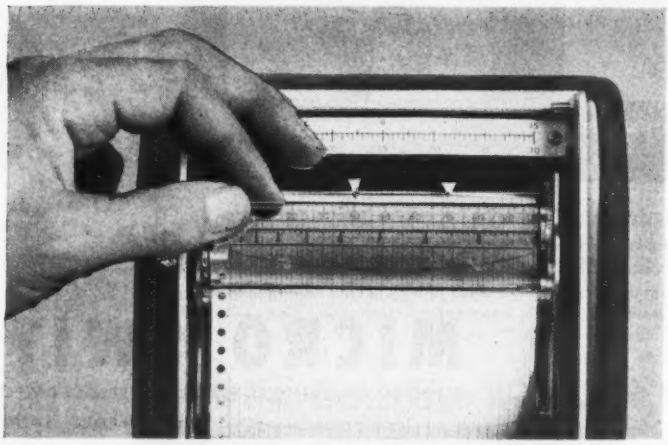
New – angle mounting Now you can panel-mount your Consotrol Recording Control Stations as much as 75° from the vertical, giving you more usable panel space closer to the floor. Operator can read lower instruments without stooping.



New – 3-pen recording 3 continuous records are simultaneously recorded on one chart, with this new Foxboro 3-pen recorder. Related measurements can be grouped for quick, easy comparison . . . valuable panel space is saved.



Full scale chart The Foxboro 4-inch Consotrol chart, with the same length scale as a 12-inch circular chart, travels vertically from the top. No sagging . . . no misalignment. Pen travels in same direction as circular-case recording pen.

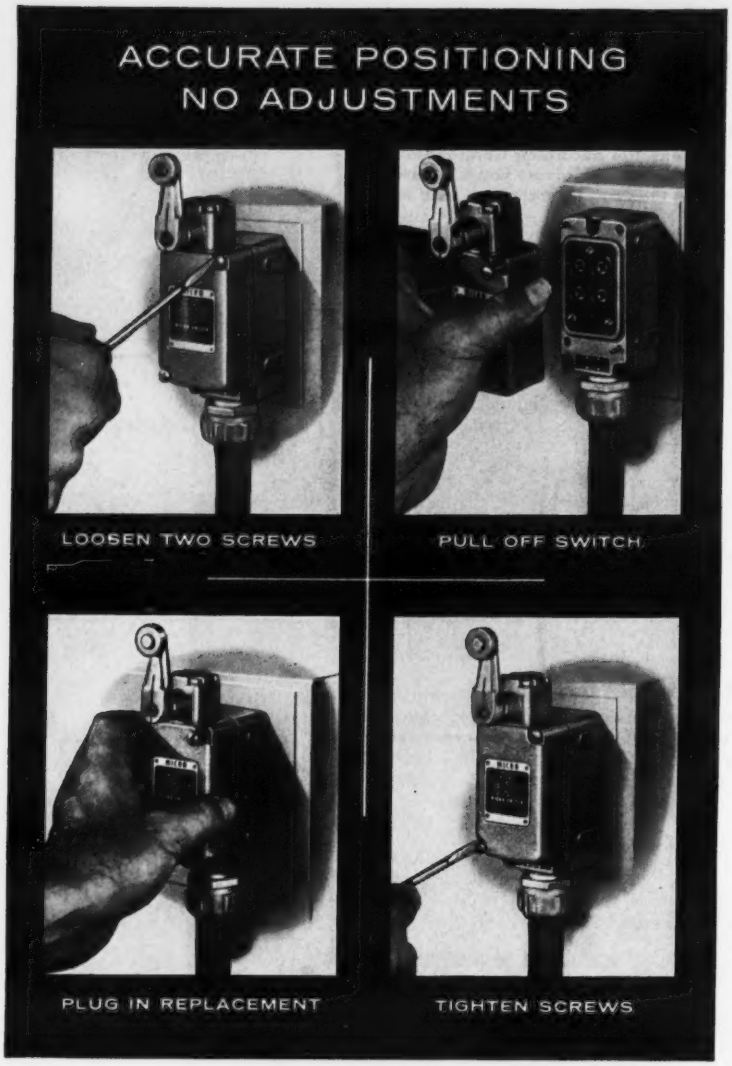


New – indicating tear-off bar Ideal for multi-pen control stations and recorders, this new "see-through" plastic tear-off bar has indicating scales to read second and third variables. Scale colors match pen colors – makes following a process a cinch for the operator.

Check 3612 opposite last page.

MICRO SWITCH Precision Switches

You can replace this precision switch in 20 seconds!

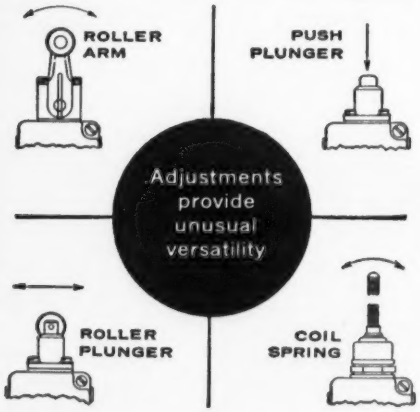


The new MICRO SWITCH "Plug-in Limit" saves many precious minutes of downtime on your high-speed automatic production lines. It plugs in like a radio tube—can be replaced in a fraction of the time required for ordinary limit switches.

This sensational new type "LS" switch offers all the features of rugged construction and precise, long-life operation as the industry-proved "1LS1" switch.

Wiring connections are made to a sealed terminal block enclosure which is permanently mounted to the machine. The switch enclosure, including all moving and mechanical parts, is plugged on to this block and precisely positioned by means of dowel pins.

Actuators available to meet all requirements



MICRO SWITCH "Plug-in Limit" switches are available at authorized distributors in key cities everywhere. Look in the Yellow Pages under "Switches, Electric." Send for Bulletin No. 20.

MICRO SWITCH
A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY
In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

First in Precision Switching

Check 3613 opposite last page.

INSTRUMENTATION

Measures total heat added or removed in BTU's

Uses: Measuring heat in total BTU's absorbed by or removed from liquids. It can also measure heating and cooling consumed in individual areas.

Features: BTU meter is corrosion-resistant, easily installed and requires no lubrication. It can be provided with counter for remote recording.

Meter automatically totalizes in BTU's, heat absorbed or removed from liquids

Description: Instrument consists of liquid meter and integrator. Liquid meter measures flow of liquid, while integrator combines difference between supply and return liquid temperatures and flow through liquid meter. Counter automatically totalizes resultant reading in BTU's. Total number of gallons is recorded on second counter.

Directly above two counters is pointer indicating temperature difference of supply and return liquid.

(Pollux BTU integrating meter is manufactured by Air Conditioning Equipment Corp., 219 E. 44th St., New York, New York.)

Check 3614 opposite last page.

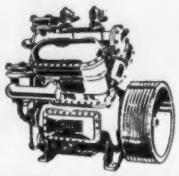
Up scope

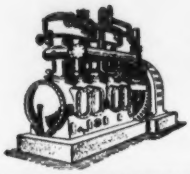
Bulletin of four pages covers design and use of industrial periscopes for remote viewing operations. Bul 301 — Kill-morgen Optical Corporation, 347 King St., Northampton, Massachusetts.

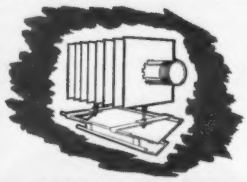
Check 3615 opposite last page.

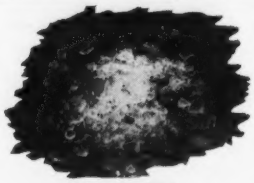
TRADE FRICK MARK®

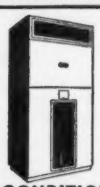
THE LEADER IN REFRIGERATION SINCE 1882

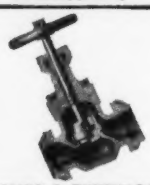

ECLIPSE COMPRESSORS


HEAVY-DUTY COMPRESSORS


PREST FIN PIPE COILS


ICE MAKERS


AIR CONDITIONING


VALVES & FITTINGS

Frick Company designs and manufactures equipment engineered to the individual requirements of your plant.

If you need any type of cooling or temperature control . . . call your nearest Frick branch office or distributor for recommendations and estimates.

✡

Offices in principal cities throughout the world.

"ECLIPSE" COMPRESSORS
2 to 9 cylinders

HEAVY-DUTY COMPRESSORS
3 by 3 to 17¾ by 12

AIR HANDLING UNITS

QUICK FREEZING SYSTEMS

BLOCK & SHELL ICE MAKERS

CONDENSERS
Evaporative & Shell & Tube

AIR CONDITIONING

LOW PRESSURE REFRIGERATION UNITS
¼ to 15 H.P.

CONTROLS, VALVES & FITTINGS

SHELL & TUBE & COIL COOLERS

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA., U. S. A.

Check 3616 opposite last page.

LOOK WHAT HAPPENS

when you

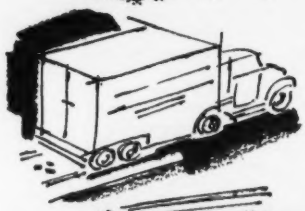
Call Cambridge

for

INDUSTRIAL WIRE CLOTH AND SCREEN

Bulk or Fabricated Parts

INQUIRIES ARE ANSWERED PROMPTLY—Whenever you call or write for information on prices, availabilities or service, you get a prompt reply.



DELIVERIES ARE MADE ON TIME—Orders for the most frequently used types of wire cloth are promptly filled. If we can't supply what you want from our complete stock, we'll schedule our looms to get it to you as soon as possible.

INSTALLATIONS ARE CHECKED—At Cambridge, orders aren't filled and forgotten. Our own sales engineers follow up your order to make sure our product is giving you the best possible service.

QUALITY, OF COURSE—Individual loom operation and countless checks on mesh size and mesh count assure you of highest quality wire cloth when you specify Cambridge.

Let us quote on your bulk or fabricated wire cloth needs. Samples for inspection or test purposes are available upon request. Call your Cambridge FIELD ENGINEER. He's listed in the phone book under "Wire Cloth." Or, write direct for FREE 94-PAGE CATALOG and stock list giving full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.

The Cambridge Wire Cloth Co.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

Department F,
Cambridge 2,
Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

Check 3617 opposite last page.

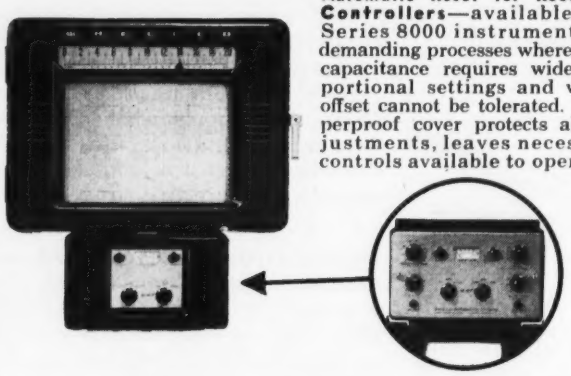
THE MARK OF QUALITY

BARBER COLMAN

Wheelco Instruments

In recorders and recording controllers ...Wheelco gives you the "extras" that really count

Series 8000 Recorders and Recording Controllers — available in a wide range of models, these self-contained null-balancing electronic instruments feature convenient swingout design for easy chart and instrument maintenance. Multi-point recorders keep permanent records of up to 16 points on a single chart — feature up to six limit switches for high and/or low signal indications . . . single- or multi-color printing . . . 3 to 24 in. per hr recording speeds.



Automatic Reset for Recording Controllers—available with Series 8000 instruments for demanding processes where small capacitance requires wide proportional settings and where offset cannot be tolerated. Tamperproof cover protects all adjustments, leaves necessary controls available to operator.

Prove in your own plant that more accurate controlling and recording makes a big difference in precision processes. Wheelco Instruments not only provide outstanding operating characteristics but feature easier adjustment, inspection, and maintenance. Get the complete story by calling your nearby Wheelco field engineer or writing today for Bulletin F-7955. Wheelco gives you faster deliveries, too!

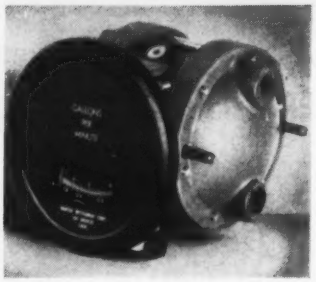
BARBER-COLMAN COMPANY

Dept. B, 1520 Rock Street, Rockford, Illinois, U.S.A.

BARBER-COLMAN of CANADA, Ltd., Dept. X, Toronto and Montreal, Canada

Industrial Instruments • Automatic Controls • Air Distribution Products
Aircraft Controls • Electrical Components • Small Motors • Overdoors and Operators
Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

Check 3618 opposite last page.



Indicating flow switch . . .

. . . has rupture-proof bellows unit. Differential pressure ranges are available from 0.20 inches WC to 0-50 psi with static pressure ratings to 6000 psi. Switch can be supplied with high or low single setting, low or high, low-low or high-high double settings, each separately adjustable. Mechanically operated milliswitch is rated at 5 amps maximum at 120 volts AC.

(Model 234 indicating flow switch is product of Barton Instrument Corporation, 580 Monterey Pass Road, Monterey Park, California.)

Check 3619 opposite last page.

Positively indicates upper and lower valve limits

Electrical control positions remote valves

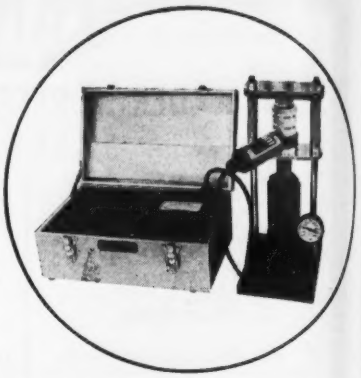
Uses: Controlling valve positions or process variables dependent upon valve action from remote locations.

Features: Electrical valve positioner allows operator to positively determine when valve is open or closed, plus supplying meter indication of valve position.

Description: Controlled valve position is displayed on six-inch meter. Positive indication of upper and lower valve limits is accomplished through definite departure of meter needle into color-coded segments at extreme ends of scale.

Valve controller is designed to operate with present motor controllers over any practical distance from only feet to miles, using leased lines or

Moisture Costs Money!



Save the high costs of too much or too little moisture. Measure moisture content quickly, economically with **Granular Moisture Register G5**—insure product uniformity and quality!

1 minute test! No stopping for time-consuming, expensive laboratory tests.

Accurate readings to 0.1% within close tolerance.

Use on production line! Voltage regulated electric power supply, or battery operated. No skilled technicians required.

Two Weeks Free Trial! Test the G5 in your plant. No obligation. Satisfaction is guaranteed.

Guaranteed accuracy on these products!

Ammonium Nitrate • Ammonium Sulphate • Toilet Soaps • Plastic Molding Compound • Polyvinyl Chloride • Ammonium Perchlorate • Sodium Bicarbonate • Polyethylene Resins

DOZENS MORE

MOISTURE REGISTER *Instruments*

Moisture Register Co.,
Dept. CPA, 910, Alhambra, Calif.

☐ *We are interested in 2 weeks free trial offer. Send additional information regarding Model G5.*

We will want to test _____

in a moisture range from ____ % *to* ____ %.

Firm Name _____

By _____ Title _____

Address _____

City _____ State _____

Check 3620 opposite last page.

standard 2-wire and ground system.

Visual alarms are included for functions as power failure, pressure, temperature, overload, and so on. Audible alarm may be coupled to visual.

Overall system accuracy is approximately 2% with a repeatability of ½%, and sensitivity of ¼%. Supervisory control unit is housed in NEMA 1 enclosure or can be panel mounted. Remote control, located at valve site, is also available either in NEMA 1 enclosures or on chasses for starter panels.

(Val-Con is product of Sparton Controls System Div., Sparton Corp., Jackson, Mich.)

Check 3621 opposite last page.

Slow-flowing liquids are no problem to meter

Teflon 'cups' prevent any liquid bypass

Uses: Metering slow-flowing liquids. Will handle high-viscosity liquids at rate of two gph and low-viscosity liquids at rate of six gph.

Features: Flow meter uses Teflon "cups" to provide positive seal between cylinder wall and piston. This design prevents any liquid bypass.

Description: Meter operates on principle of positive volumetric displacement. Liquid within cylinder is displaced by piston, achieving accuracy within ¼ of 1 percent.

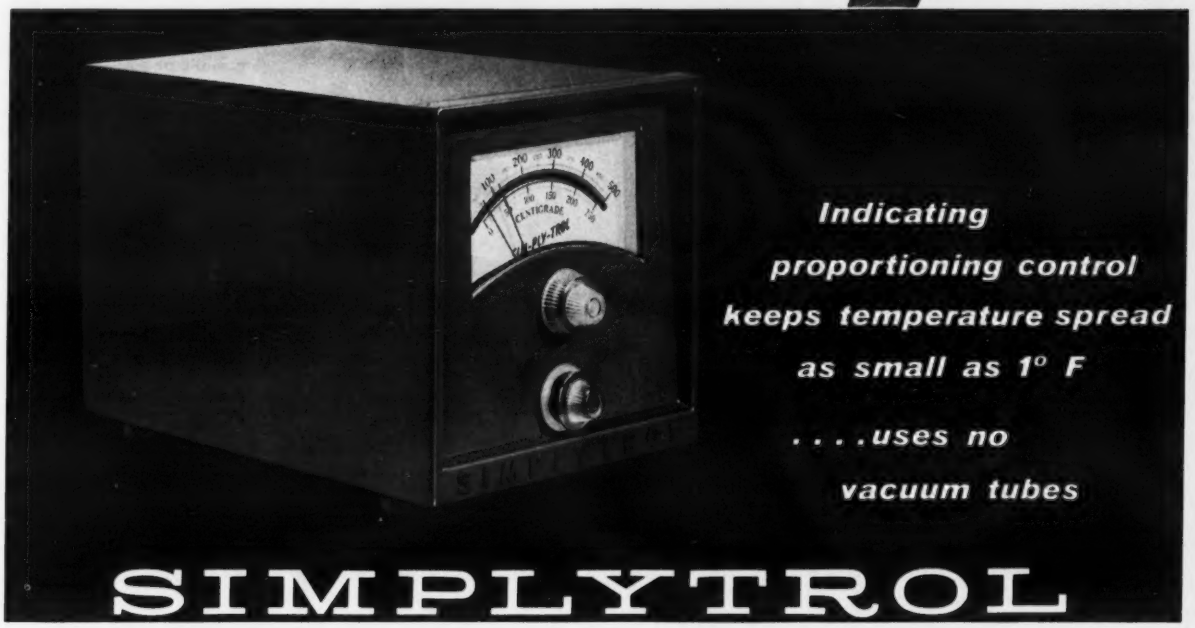
Maximum flow rates are up to 120 gph. Exterior construction is of cast iron and steel. Interior moving parts are of stainless steel.

Flow meter is available with straight-reading dial with large numbers that permit reading from a distance or angle. Model is also available with printing dial which automatically produces a printed record of exact number of gallons metered.

(Slo-flo XACTO Meters are product of Bowser, Inc., 1300 E. Creighton Ave., Fort Wayne, Ind.)

Check 3622 opposite last page.

a new api meter-relay temperature controller that...



SIMPLYTROL

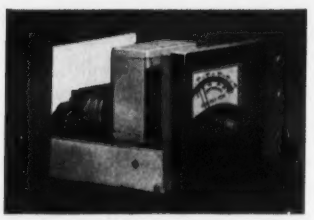
This Simplytrol time-proportioning control anticipates temperature overshoot, and shuts off heat in time to prevent it.

As the contact on the indicating pointer of the Simplytrol meter-relay moves close to the contact on the set pointer, an anticipating circuit permits electrostatic attraction between the contacts to build up.

The result is extreme sensitivity close to the set point, since any change in temperature there is greatly magnified. A very small rise shuts heat down; a slight decrease gives a longer duty (heat on) cycle.

Controls are thermocouple-actuated and give continuous indication without the distortion sometimes found in non-absolute systems. 21 ranges covering temperatures from –400° to +3000°F. List prices from $147 to $165.

Ask for Data Sheet No. 9.



Equally suitable for panel mounting or table use, the new Model 200 housing is 6½" x 6½" x 10" approx.

Assembly Products Inc.

75 Wilson Mills Road, Chesterland 36, Ohio • Phone (Cleveland) HAmilton 3-4436

Specify api meter relays with LOCKING CONTACTS for dependability

See us at the Atom Fair, International Amphitheatre, Chicago, March 17-21

Check 3623 opposite last page.

Simplify control problems...

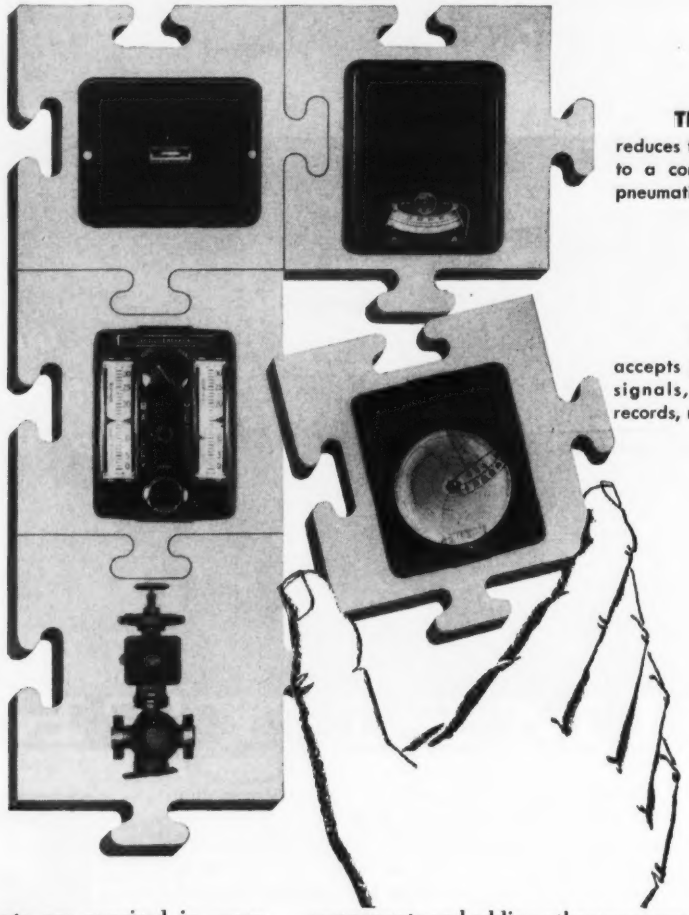
with the Bailey Building Block Method

Control problems are greatly simplified when you attack them using the Bailey Building Block Method. In a nutshell, the method consists of using standard components that fit together like building blocks. Virtually any control requirement can be handled by selecting standard components. Here are the parts you use and the functions they perform.

CONTROL RELAY
takes signals from the transmitter and computes corrective action in terms of pneumatic signals.

SELECTOR STATION
gives operator choice of hand or automatic control including set-point or bias adjustments.

POWER UNIT
is the "muscle" of the system. It performs whatever precise mechanical action is necessary to achieve control.



TRANSMITTER
reduces the measured variable to a common denominator, a pneumatic or electric signal.

RECEIVER
accepts pneumatic or electric signals, indicates and/or records, measurements.

Not all these components are required in every control system. You buy only what *your* system needs. When you change processes or add more automatic control, you can add additional standard components. Sometimes you may want to build a whole new system, re-using some of the existing components and adding other new ones. Spare parts inventory and maintenance training are reduced.

Hear the complete story of the Bailey Building Block System. Find how it can solve your control problems. See your Bailey Engineer or write for more information.

CP-1-1

BAILEY METER COMPANY
CHEMICAL AND PETROLEUM DIVISION
1074 IVANHOE ROAD, CLEVELAND 10, OHIO
In Canada—Bailey Meter Company Limited, Montreal

BAILEY BUILDING BLOCK METHOD

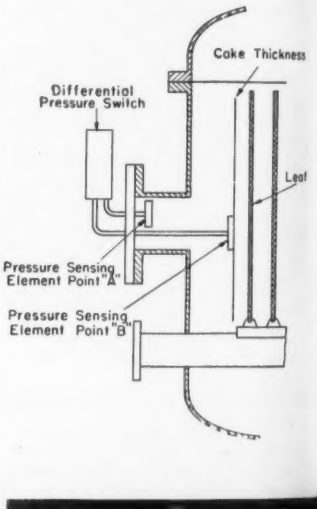
RESULTS IN: FLEXIBILITY, SIMPLICITY, ECONOMY

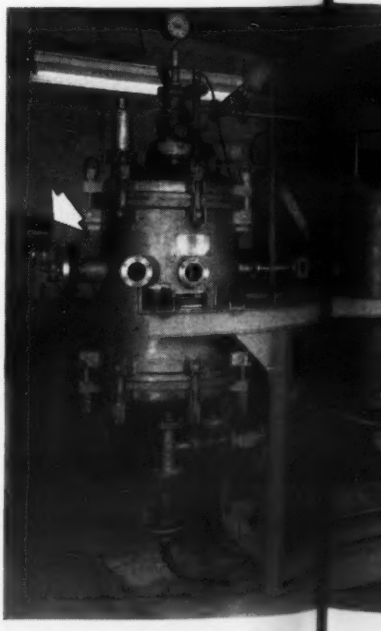
Check 3624 opposite last page.

Eliminating guesswork in filter cake thickness determinations, recently developed detector-indicator serves as primary monitor,

Permits fully control of

Uses: Indicating when filter cake in leaf pressure filters has reached a predetermined thickness. Indication of cake thickness closes circuit which will sound an alarm. Instru-





automatic filtration

ment will take filter off line automatically and into clean cycle by means of remote control device.

Features: Cake thickness detector makes automatic filtration possible. It eliminates problem of exceeding solids capacity of filter leaves, with bridging, and subsequent damage to filter elements.

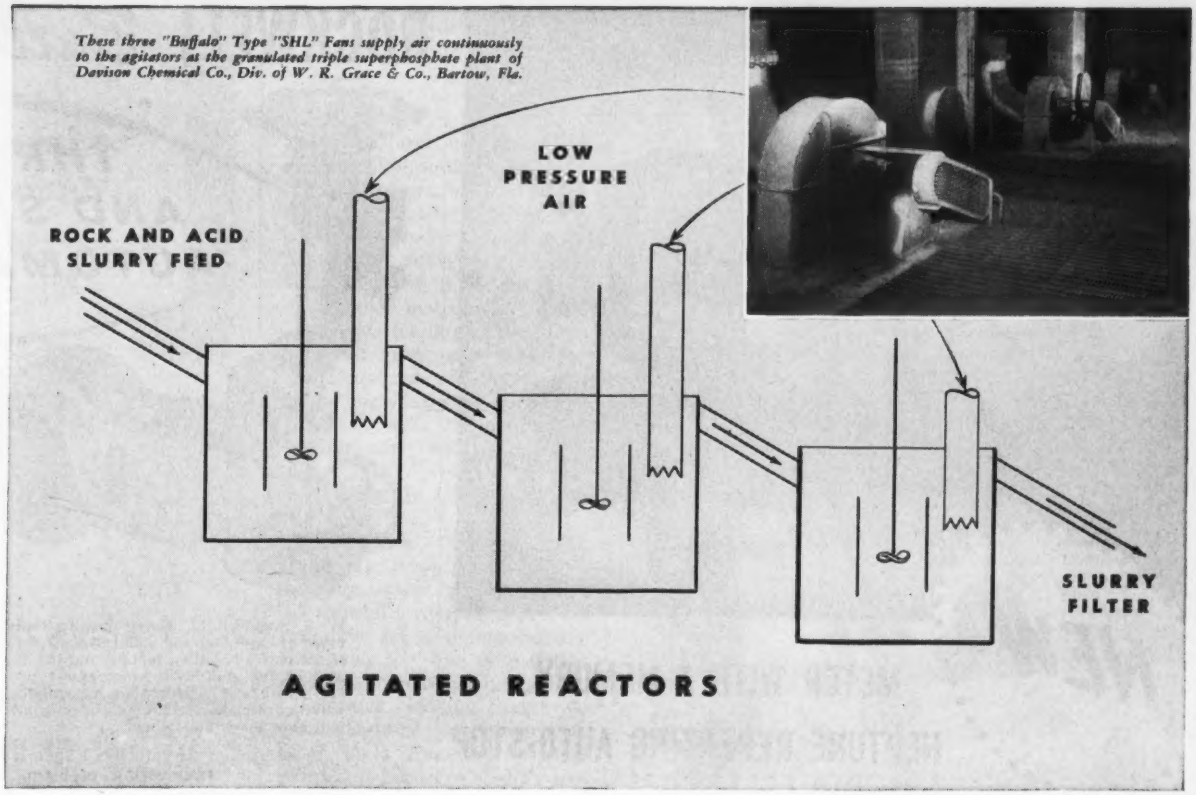
Instrument will provide positive control of cake thickness. Since flow and pressure in leaf-pressure filters can be

To page 175

◀ Schematic of instrument installed on leaf pressure filter. Fully automatic control is possible by combining unit with previously available equipment

Pilot plant installation. Cake thickness detector's differential pressure switch (arrow) automatically cuts filter out of line when predetermined cake thickness is reached ▼

These three "Buffalo" Type "SHL" Fans supply air continuously to the agitators at the granulated triple superphosphate plant of Davison Chemical Co., Div. of W. R. Grace & Co., Bartow, Fla.



REACTION TEMPERATURE controlled by low pressure air –

– in production of granulated triple superphosphate

At one stage in the production of this highly concentrated phosphate fertilizer, phosphate rock and sulfuric acid react together in a series of pre-mixer and agitator tanks. The reaction is exothermic, and must be maintained at the optimum temperature of 70° to 75° C.

This important temperature control is dependably held by large volumes of low-pressure air from the "Buffalo" Fans, blown continuously thru the slurry in the three agitator tanks — via special distributor pipes, forming bubbles which carry away the excess heat as evaporated water. Just one more place where a modern chemical plant relies on "Buffalo" for punishing air jobs, as industry has been doing for the past 80 years.

"BUFFALO" FANS FOR CHEMICAL SERVICE include efficient central-system ventilating fans, industrial exhausters, rubber-lined and resin-bonded fiber glass fans for corrosive fumes — all built to the high standards of the "Q" Factor*. Write for recommendations on your air handling or air cleaning problem. There's a modern "Buffalo" unit to solve it to satisfaction.

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

BUFFALO FORGE COMPANY
BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

Check 3625 opposite last page.

NEW

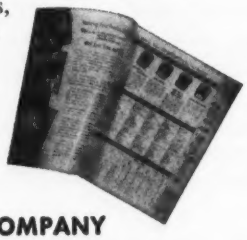
METER WITH A MEMORY...
NEPTUNE REPEATING AUTO-STOP

Set it once... delivers same quantity of liquid batch after batch

You batch faster, free operator's time for other duties, and prevent setting errors with this *repeating* Auto-Stop meter. Set the quantity required by the formula just once, simply by pressing buttons. Then open the valve and the meter does the rest. It shuts off automatically at the exact amount. The meter "remembers"... delivers the same amount each time the valve is opened until reset for a different quantity.

Neptune meters end spoiled batches, overfilling, spillage and slow weighing. No more buckets or gauge sticks. Meters are safer, too. Hazardous liquids stay inside the pipe.

You can now meter hundreds of liquids ... hot and cold water, syrups, oils, solvents, soap solutions and many chemicals. Auto-Stop meter capacities 5 to 300 gpm. Other Neptune features include ticket-printing registers and electrical Auto-Switch (shown above) to control pumps, valves or signals. Neptune Meters with simple counters or dials also available from ⅝ to 6 in. Ask for free technical metering Bulletin 566-O P.



neptune liquid METERS

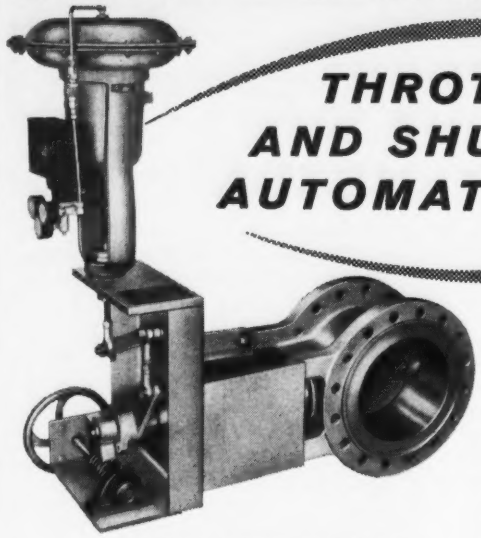
NEPTUNE METER COMPANY
19 West 50th Street, New York 20, N. Y.

Branches in ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER • LOS ANGELES • LOUISVILLE • No. KANSAS CITY, Mo. • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO (Millbrae) • IN CANADA: TORONTO 14, ONT.

Check 3626 opposite last page.

ROCKWELL *Butterfly* VALVES

THROTTLE AND SHUT OFF AUTOMATICALLY



W. S. Rockwell 12" heavy duty butterfly valve of cast steel and stainless steel construction for handling refinery recycle gas at 265 psi and high temperature; provided with heat radiating fins, air actuator, valve positioners, declutching mechanism and emergency handwheel.

If you have a special valve engineering problem, we're here to help you.

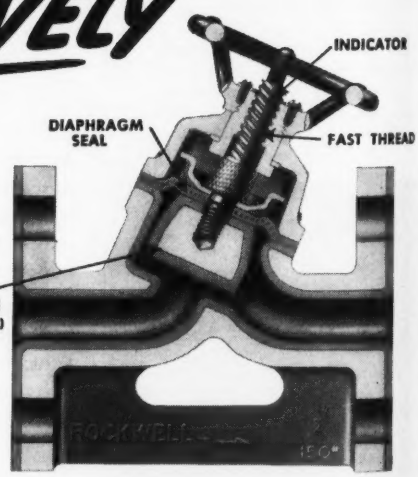
No matter what the pressure, temperature or nature of fluid, with Rockwell Butterfly Valves you can get precise, automatic regulating, throttling and shut-off.

Made in all sizes to 144" in any metal (or rubber-covered for corrosion resistance and/or drop-tight closure), or in stress seal design for extremely high temperatures. These valves may be equipped with pneumatic, hydraulic or electric operators for direct or remote control. Manual control also available.

There's a place in your piping system for these lower cost, more compact, easier-to-operate valves. Catalog on request.

CLOSES and SEALS *POSITIVELY*

"D-D" Diaphragm Valve



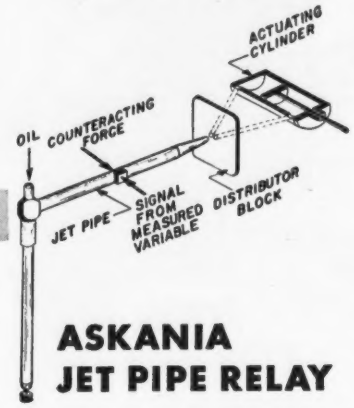
Disc for Positive Closure
Diaphragm for Positive Sealing

- **No packing gland to leak. Mechanism not exposed.**
- **Oversized ports; high capacity; low pressure drop. Largest capacity of any diaphragm type valve.**
- **Self-draining in horizontal position.**
- **Lower handwheel torque and fewer turns to close.**
- **Automatic control available.**
- **Body of any metal or with any lining. Sizes ½" to 6". Write for Bulletin 800.**

W. S. ROCKWELL COMPANY
2208 ELIOT STREET • FAIRFIELD, CONN.
Sales Representatives in Principal Cities

Check 3627 opposite last page.

Key Component for Those Tough Control Jobs



THE ASKANIA JET PIPE RELAY

for Pressure • Flow • Proportioning Combustion • Position

The Askania Jet Pipe Relay, nucleus of Askania Controllers, is designed and built for the TOUGH control jobs. You can depend upon it for the operation of LARGE, HEAVY valves, dampers, engine throttles and other final control elements or those having high thrust requirements.

The Askania Jet Pipe Relay provides double acting positive correcting power which opens and closes the valve without the need of a spring return.

Ruggedly constructed, Askania Jet Pipe Control systems are used for flow, pressure, proportioning and combustion control applications. Askania Jet Pipe Controllers

- operate equally well indoors and outdoors—won't freeze
- operate even under the most adverse ambient conditions
- are easily installed
- require minimum maintenance
- give instantaneous response to minute changes in the measured variable

Send for General Catalog—which describes and illustrates how Askania Jet Pipe Regulators can be applied to various process applications...shows you the solution to your own tough control problems. Write Askania Regulator Company, 242 E. Ontario St., Chicago, Ill.

ASKANIA REGULATOR COMPANY
"CONTROLS FOR INDUSTRY"
Hydraulic, Electrohydraulic and Electronic Controls—Valve Actuators and Cylinders—General System Engineering
A SUBSIDIARY OF GENERAL PRECISION EQUIPMENT CORPORATION

Check 3631 opposite last page.

From page 173

measured and controlled by conventional equipment, clarity being measured by turbidity meter, instrument makes it possible to have also primary monitor of remaining process variable, cake thickness.

Because instrument prevents overloading, filters can be sized more accurately for job. Reduction of filter size in many installations can be as much as 50%. By combining smaller size with automatic filter cycle, operators can reduce not only initial cost but operating costs.

Description: Unlike conventional methods which measure cake thickness by differential pressure across complete filter, detector-indicator works by differential pressure at two specific points.

Pressure sensing point A (see diagram) is pressure of filter tank. Pressure sensing point B is pressure slightly inside filter cake. Pressures are identical during early part of filtration cycle. Cake thickness increases until element at B is slightly embedded in filter cake and senses a lower pressure. Differential pressure switch, comparing these two pressures, closes an electrical circuit to begin next step in filter cycle. Switches are sensitive to a differential as low as 10″ of water head.

Two diaphragm pressure-sensing elements filled with silicone oil are used. Elements can be fabricated to meet any conditions of temperature or corrosive process materials.

(For more information on Cake Thickness Detector contact The Duriron Co., Inc., Dayton, Ohio.)

Check 3632 opposite last page.

Power transistor tester

Instrument for rapid evaluation of NPN and PNP power transistors at normal operating power is described and illustrated in manufacturer's bulletin sheet. Bul 572-3 — Strand Engineering Company, 1354 N. Main St., Ann Arbor, Michigan.

Check 3633 opposite last page.

As SIMPLE and Dependable as the Pull of a MAGNET!

A sleeve, raised and lowered within a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Basically, this is Magnetrol.

MAGNETROL

The Simplest, Most Versatile LIQUID LEVEL CONTROL Ever Devised!

Linked to liquid level by infallible magnetic force, Magnetrol is free from the limitations inherent in mechanical or electrical controls. With the actuating magnet rated at 98% of initial strength after 30 years, Magnetrol has *infinite operating life,* with practically no maintenance at all. There are no wearing parts to get out of order.

What's more, Magnetrol's simple operating principle permits easy, economical modification of standard units to meet *any* pressure, temperature or corrosion requirements. That's why there's practically no limit to Magnetrol's use. It's also why "specials" are likely to be standard with us. Magnetrol units control level changes from .0025-in. to 150-ft. —with single or multi-stage switching.

MAGNETROL, Inc.

● SEND COUPON FOR DETAILS

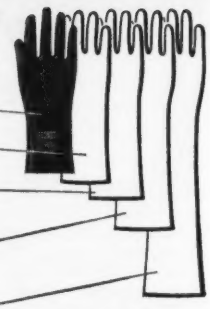
MAGNETROL, Inc. 2129 S. Marshall Blvd., Chicago 23, Illinois
Please send me catalog data and full information on Magnetrol Liquid Level Controls.
Name _____
Company _____
Address _____
City _____ Zone _____ State _____

Check 3634 opposite last page.

These Stanzoil® Milled Neoprene Gloves
Guarantee Positive Liquidproof Protection in
103 Basic Oils, Acids, Caustics, Greases, Solvents

Black All Neoprene Stanzoils With Non-slip Grip

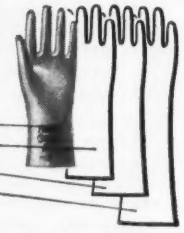
Model	Weight	Fingers	Length
N-31	Light	Straight	10½″
N-35	Light	Curved	10½″
N-32	Medium	Straight	11″
N-36	Medium	Curved	11″
N-41	Heavy	Straight	12″
N-44	Heavy	Curved	12″
N-51	Heavy	Straight	14″
N-33	Light	Straight	14″
N-54	Heavy	Curved	14″
N-71	Heavy	Straight	18″
N-73	Light	Straight	18″
N-74	Heavy	Curved	18″



White All Neoprene Stanzoils With Smooth Finish

Model	Weight	Fingers	Length
N-30	Light	Curved*	10½″
NW-31	Light	Straight	10½″
NW-32	Medium	Straight	11″
NW-41	Heavy	Straight	12″
NW-51	Heavy	Straight	14″

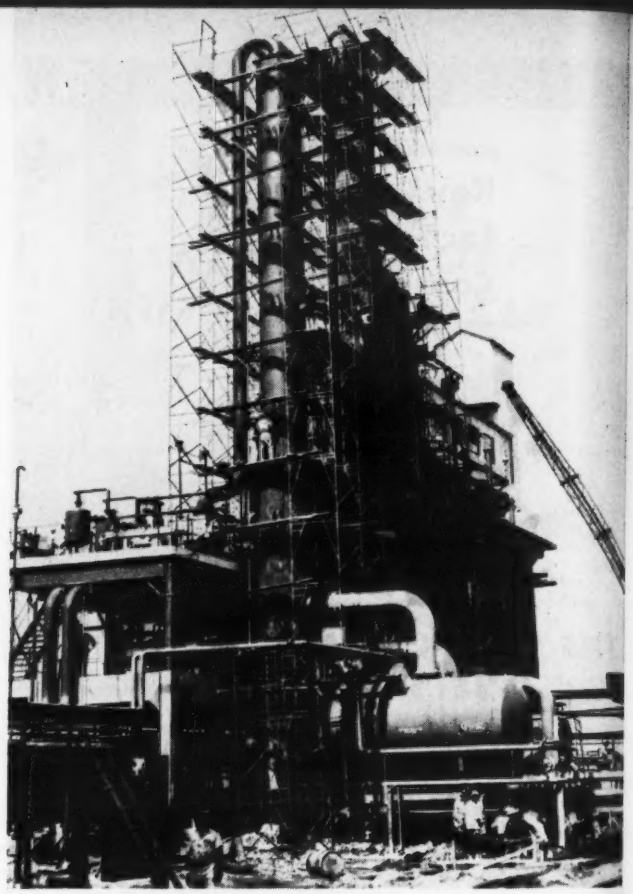
*Non-slip



FREE Hand Protection Analysis . . . Send a description of your job requirements (length, dexterity, wear resistance, chemicals used, importance of safe grip, hot or cold temperature extremes, fatigue factor and sizes) to our "Hand Protection Clinic." New catalog and price list available on request.

the PIONEER Rubber Company
241 Tiffin Road, Willard, Ohio

Check 3635 opposite last page.



Sectional scaffolds — basic unit is end frame joined to diagonal braces with wing nuts or slide locks

Using scaffolding?

Here are the cardinal rules for maximum safety

Although a well made scaffold is inherently safe, nonetheless, good safety practices in the maintenance and use of scaffolding equipment are important, not only to reduce accidents but to increase efficiency and cut costs.

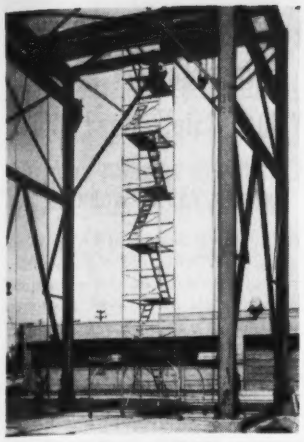
Here are 22 cardinal rules for handling the three most common types of scaffolding: sectional, rolling, and swinging scaffolds.

Sectional Scaffolds

1. Keep scaffolds plumb and level at all times. Use the adjusting screws rather than blocking.
2. On exterior work, tie into wall every 25′ of height and every 28′ of length.
3. Use guard railing at all heights.
4. Never climb on cross braces.
5. When in soft ground, set the base plates in sills to spread the load.
6. Check all wing nuts and locks.
7. Use horizontal cross braces in addition to diagonal braces.
8. Make sure that planking meets load requirements.
9. Never use even slightly damaged material.

Sectional Rolling Scaffolds

1. Lock all caster brakes when tower is in working position.
2. Height of working platform should not exceed four times that of the smallest base dimension.
3. Do not extend adjusting screws fully.
4. Provide sufficient horizontal bracing.
5. Never allow workmen to pull themselves along while on top of rolling scaffold.



Sectional rolling scaffolds — outriggers (extending from lower part of scaffold) give stabilization

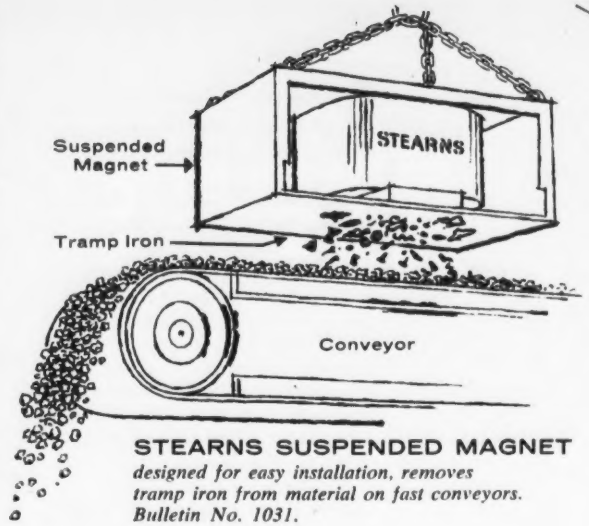
Light-duty swinging scaffolds — frequent inspections of ratchet, pawl, and steel wire ropes are a must

Light-duty Swing Scaffolds

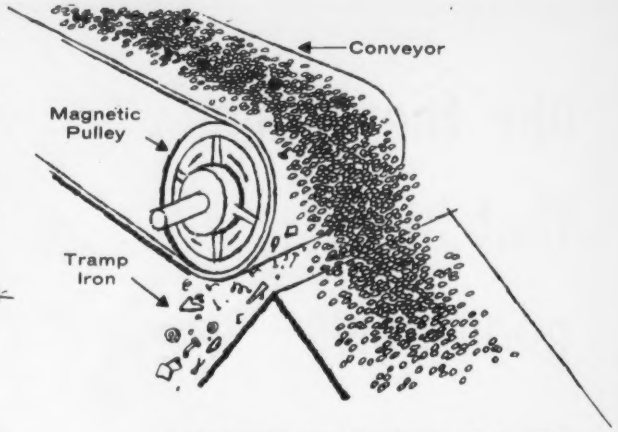
1. Keep all bearing points well lubricated.
2. Inspect ratchet and locking pawl springs to see that they are in good working condition.
3. Keep weight of men and materials evenly distributed. Never overload.
4. Reinforce the outrigger supports if the overhang exceeds distance specified.
5. Properly install toe boards and guard rails.
6. Keep pawls engaged at all times, except when unreeling wire ropes or lowering the scaffold.
7. Do not alter, remove, or substitute parts.
8. Overlap planks at least one foot on each side of putlog.

(More detailed information on specific types of scaffolding may be obtained from The Patent Scaffolding Co., Inc., Long Island City 1, N.Y.)

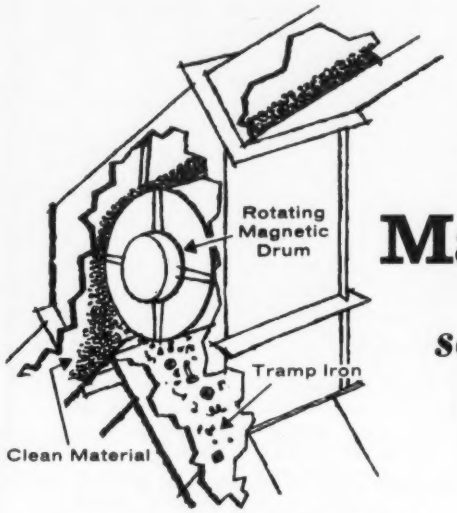
Check 3636 opposite last page.



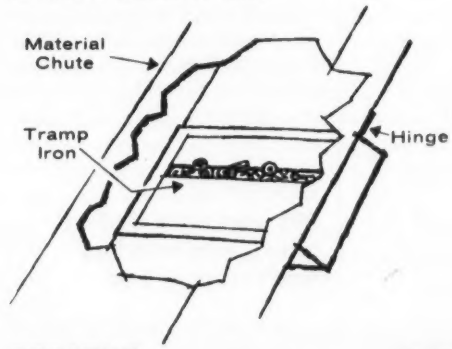
STEARNS SUSPENDED MAGNET
designed for easy installation, removes tramp iron from material on fast conveyors. Bulletin No. 1031.



STEARNS MAGNETIC PULLEY
at head of conveyor line removes tramp iron continuously, efficiently, automatically. Bulletin Nos. 303D and 350C.



STEARNS MAGNETIC DRUM
automatically removes tramp iron from flowing material in spouts and chutes. Bulletin No. 93E.



STEARNS "MAGMAN" PLATE MAGNET
efficiently removes tramp iron from material in chutes, spouts, ducts or on conveyors. Bulletin No. 1071P.

STEARNS Engineered Magnetic Protection

solves your tramp-iron problems

Whatever your product — however it flows — on belts, in chutes or ducts or pipe — magnetic separation of troublesome tramp iron can be a built-in feature of the line. Stearns engineers can help you get the most efficient protection for your present conveyor or any new system you're planning.

These men are specialists — representing a company with more than 40 years of leadership in design and application of magnetic equipment. They will work with any conveyor manufacturer you designate — or with your own plant engineering staff — to design the ideal installation for your particular process.

Teamwork like this is your guarantee of *engineered protection for your product and your plant* — from the planning stage to the finished job. Call your Stearns representative, or write today for free literature.

STEARNS MAGNETIC PRODUCTS
A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY
635 SOUTH 28TH STREET • MILWAUKEE 46, WISCONSIN

Check 3637 opposite last page.

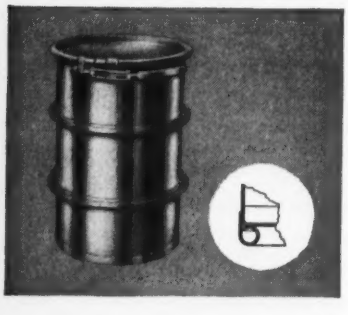
like the chimes that bring good news

Hackney chimes bring longer profitable lives to stainless steel drums

With smooth, crack-free bottoms, reinforced by special welded chimes, Hackney stainless steel drums clean easier, save more on maintenance costs.

Whether storing or shipping foods or other products, corrosion-resistant stainless steel guards against all contamination. Durable yet lightweight, these drums cut shipping and handling costs in a hurry.

Available in 30-, 50- and 55-gallon capacities. Equipped with a single bolt type or a quick-acting Toggle-tite clamp closure to provide a liquid-tight returnable drum.



I-bar hoops eliminated when a straight side container is required. Nickel or Monel drums available upon request.

Special Hackney welded chime is easy to clean, strong and durable.

Pressed Steel Tank Company

Manufacturer of Hackney Products

1463 South 66th Street, Milwaukee 14, Wisconsin

Branch offices in principal cities

Hackney

CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

Check 3638 opposite last page.

Gage gives instant check on operable condition of fire extinguisher

Lightweight, simple device operated with one hand

Uses: For extinguishing fires where water cannot be used such as electrical and flammable liquid fires; for propane, butane, and other gas fires; and, for fires in ordinary combustibles such as cotton lint, fabrics, and weeds, which are not deep-seated.

Features: Pressure gage is marked for instant check on its operable condition. Any unreported use is signaled before emergency of a fire. Unit's light weight and simple mechanism permit one hand operation by man or woman.

Description: Small, 3-lb capacity dry powder fire extinguisher measures only 17½" in height by 4¾" in diameter, and weighs 8 lb fully charged. It is pressurized with 130 psi nitrogen and charged with specially treated bicarbonate of soda—free-flowing, non-caking, non-toxic, and non-abrasive.

One-piece spun steel cylinder meets ICC standards and is hydrostatically tested for 800 lb with a rupture point of 3000 lb. All working parts are brass or bronze. Dry powder is the only extinguishing medium which can be used safely on a human being whose clothing is on fire.

("Dri-Power" fire extinguisher is product of Safety First Products Corporation, Elmsford, New York.)

Check 3639 opposite last page.

PVC protective clothing tough, long wearing, won't crack or peel

Completely weatherproof at all points

Uses: As protective clothing against chemicals, oils, greases, rain, sea water, and sunlight.

Features: Controlled PVC-impregnated clothing is said to be tougher and longer

NEW CONCEPT OF SAFETY AND STABILITY IN BALLYMORE Safety-Step LADDERS

SECURE FEELING OF WORKERS RESULTS IN BETTER, FASTER WORK

The new pyramid design of BALLYMORE Safety-Step LADDERS offers above-floor working safety never before available. Thirty-five models offer work levels up to fifteen feet.

Write to the Ballymore Company, West Chester 10, Pa., for the new 20-page catalog. Describes complete line of Ballymore equipment for above-floor working safety.

MANY MODELS TO CHOOSE FROM

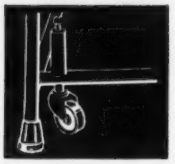
STEEL OR ALUMINUM

REVOLUTIONARY PYRAMID DESIGN GIVES ADDED SAFETY

PYRAMIDED FOR SAFETY

Three-step, "A" type

Casters provide finger-tip mobility. Rubber-tipped legs lock to floor when in use.



Seven-step, Handrails

CHOICE OF WIDTHS 20" or 30" at bottom

CHOICE OF HEIGHTS One to seven steps, steel. One to five steps, aluminum.

BALLYMORE "Hi-boy" SAFETY-STEP LADDERS with BALLYLOCK

Step on the pedal, two legs and non-swiveling rear casters hold ladder firmly in place while in use. Release pedal, ladder rolls easily to location of next job.

Eight-step, work levels up to twelve feet.

TOP PRODUCTION WITH SAFE, CONVENIENT WORK PLATFORMS AND HYDRAULIC LIFTS

Fixed and adjustable-level work platforms and mobile access lifts available in many sizes. Special platforms and lifts designed to fulfill specific requirements.

BALLYMORE EQUIPMENT FOR ABOVE-FLOOR WORKING SAFETY

THE STANDARD BY WHICH ABOVE-FLOOR SAFETY IS JUDGED

Check 3640 opposite last page.

wearing than conventional protective clothing. It will not crack, peel, deteriorate, or become tacky, either in use or storage.

Description: After stitching, main seams of controlled PVC-impregnated clothing are shielded and then electronically welded.

This assures complete weatherproofing at all points, and adds to the strength of garment.

PVC-impregnated foul weather clothing provides protection against chemicals, oils, greases, and the elements

Clothing is provided with electronically welded plastic buttons unless otherwise specified. This provides a nonconductive garment.

Made for flexibility and comfort, clothing comes in several colors and is available in sizes to fit individual requirements.

(North PVC protective clothing is available from Jomac Inc., 6128 North Woodstock St., Philadelphia 38, Pa.

Check 3641 opposite last page.

Boiler safety controls

Bulletin of 24 pages covering basic safety controls for all low-pressure steam boilers tells the "why" and "how" of providing maximum safety and automatic water level control. Bul L-711 — McDonnell & Miller, Inc., 3500 N. Spaulding Ave., Chicago 18, Illinois.

Check 3642 opposite last page.

There's a CESCO Representative Nearby Ready to Give Me Fast Action On Any Safety Equipment Need

As a safety engineer, I expect two things from my safety equipment source—a complete line of all types of safety equipment and prompt delivery of my order. For years, CESCO has more than met these requirements on both counts. Their distributors are truly safety specialists in every sense of the word, who offer a well-engineered, top quality line of safety glasses, goggles, face shields, welding helmets, respirators, hoods—in fact all of my many safety equipment needs. Equally important, their distributors are located from coast to coast, ready to give expert safety equipment advice. Then, they back up their recommendations with fast delivery of my order. In most cases, I've found the CESCO distributor is able to fill my order from his own stock.

Make a note of the CESCO distributor nearest you and call him next time you have a safety equipment problem

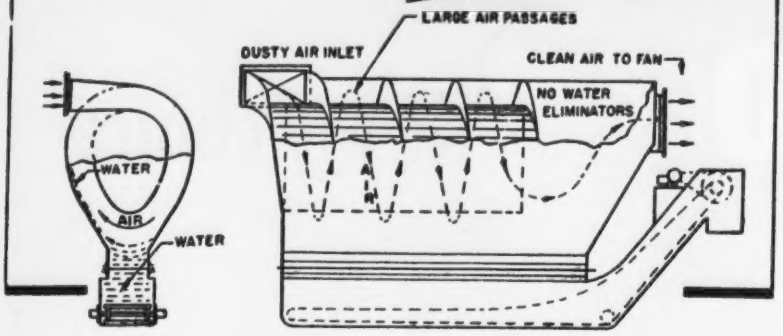
BUY CESCO PRODUCTS FROM THESE SAFETY EQUIPMENT DISTRIBUTORS

ATLANTA, GA. — Guardian Safety Equipment Co., 1091 Euclid Avenue, N. E.
BATON ROUGE, LA. — Guardian Safety Equipment Co., 3615 Capitol Heights Ave.
BIRMINGHAM, ALA. — Industrial Safety Supply Co., 1727 Huntsville Road
BOSTON, MASS. — General Equipment Corporation, 351 Franklin Street
BUFFALO, N. Y. — The Watson Company, 1443 South Main Street
CHICAGO, ILL. — Universal Safety Equipment Co., 5115 West Diversey Avenue
CINCINNATI, OHIO — Williams & Co., Inc., 3231 Fredonia Avenue
CLEARWATER, FLORIDA — Car-Med Equipment Company, 606 Palm Avenue, Belleair
CLEVELAND, OHIO — Williams & Co., Inc., 3700 Perkins Avenue
COLUMBUS, OHIO — Williams & Co., Inc., 900 Williams Avenue
DALLAS, TEXAS — Guardian Safety Equipment Co., 3670 Flexley Drive
DETROIT, MICH. — Averill Equipment Company, 19225 Consent Avenue
HOUSTON, TEXAS — Guardian Safety Equipment Co., 200 Sandman Street
KANSAS CITY, MO. — Safety, Incorporated, 17½ East 31st Street
KNOXVILLE, TENN. — Safety Equipment Distributing Co., 832 West Main Avenue
LOS ANGELES, CALIF. — Guardian Safety Equipment Co., 7225 South Main Street
LOUISVILLE, KENTUCKY — Williams & Co., Inc., 1109 South Preston Street
MILWAUKEE, WIS. — Universal Safety Equipment Co., 3155 South Seventh Street
NEW YORK, N. Y. (See ORANGE, N. J.)
ORANGE, N. J. — Guardian Safety Equipment Co., 400 South Jefferson Street (New York-New Jersey Area)
PEORIA, ILL. — Standard Industrial Products Co., 920 North Garfield Avenue
PHILADELPHIA, PA. — Guardian Safety Equipment Co., 214 South 45th Street
PITTSBURGH, PA. — Williams & Co., Inc., 901 Pennsylvania Avenue
ST. LOUIS, MO. — Safety, Incorporated, 2608 Olive Street
ST. PAUL, MINN. — Continental Safety Equipment, Inc., 1551 Selby Avenue
SALT LAKE CITY, UTAH — Universal Safety & Fire Equipment Co., 727 South West Temple
SAN MATEO, CALIF. — Guardian Safety Equipment Co., 220 East Third Avenue
SPOKANE, WASH. — Spokane Safety Appliance Co., N. 219 Division Street
TOLEDO, OHIO — Williams & Co., Inc., 946 Kane Street
TULSA, OKLA. — Guardian Safety Equipment Co., 1742 South Main Street
MEXICO CITY, D. F. — Safety Equipment, S. A., Sullivan No. 95
MONTREAL, CANADA — The Bellor Optical Company, Ltd., 1529 Mountain Street

CESCO

Check 3643 opposite last page.

THIS IS THE .... Air Tumbler



the master of Dust in industry ★ ★ ★

SIMPLE — DEPENDABLE — NO FIRE HAZARD
HIGH EFFICIENCY — CONSTANT CAPACITY
LOW OPERATING COST

More than one million CFM in ONE plant

Write for Bulletin No. 551. Address:

DUST SUPPRESSION & ENGINEERING COMPANY

P. O. BOX 67, LAKE ORION, MICHIGAN

Agents in all principal U. S. cities

Check 3644 opposite last page.

HAWS DRENCH SHOWERS

RID THE BODY OF CAUSTICS and CHEMICALS
Instantly! Thoroughly!

ACCIDENTS with caustic chemicals strike with shocking swiftness—and HAWS Drench Showers are instantly ready to deliver relief just as fast! A solid downpour washes away destructive materials—saving seconds until medical aid arrives, possibly averting serious injury and excessive compensation claims. HAWS Drench Showers can help you! Write for details and illustrated literature.

MODEL 8935—Drench shower augmented by HAWS eye-wash fountain. A complete safety station—always ready!

HAWS

DRINKING FAUCET CO.

(Since 1909)

1443 FOURTH STREET · BERKELEY 10, CALIFORNIA

Check 3645 opposite last page.

SAFETY

Floor, scrubbing machine carries explosion-proof UL listing

Three-gal tank for handle converts unit for scrubbing

Uses: For polishing, dry-scraping, and scrubbing.

Features: According to manufacturer, unit is first and only explosion-proof floor machine UL-listed for Class 1, Group D, and Class 2, Gp. G.

Description: Floor machine is available with complete selection of UL-listed static conductive brushes for scrubbing, polishing, and dry-scraping. Three-gal tank that can be attached to handle converts unit for fast scrub.

Development of UL-listed explosion-proof floor machine permits plants, refineries, and mills with explosive atmospheres to guarantee safe maintenance

(Model CX explosion-proof floor machine is product of Hild Floor Machine Company, Inc., 740 West Washington Blvd., Chicago 6, Ill.)

Check 3646 opposite last page.

Coated-fabric gloves

Catalog of eight pages describes and illustrates manufacturer's six different lines of coated-fabric gloves, each designed for specific applications. Coated-fabric glove cat — The Granet Corporation, 1 Loring Dr., Framingham, Massachusetts.

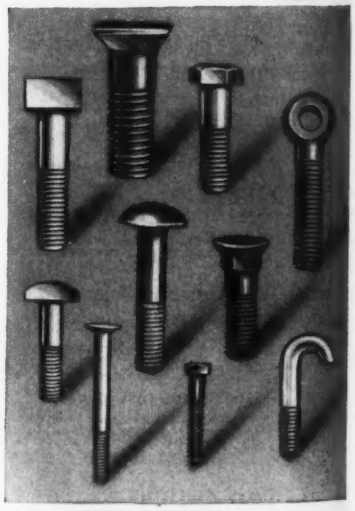
Check 3647 opposite last page.

Threaded Specialties

lower cost
TEE BOLTS
by an exclusive method

Among Pawtucket's many specialty products are these lower-cost tee-head bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.
Pawtucket tee head bolts are made in standard sizes ¼" and larger, or to your specifications. In any size, you can depend on a uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, including Titanium



BETTER BOLTS SINCE 1882

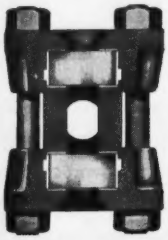
PAWTUCKET
MANUFACTURING COMPANY
327 Pine St. · Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.
"The Bolt Man"

Check 3648 opposite last page.

Strahman

HIGH PRESSURE GAUGES

USED IN **REFINERIES** *AND* **CHEMICAL PLANTS** *THROUGHOUT THE WORLD*



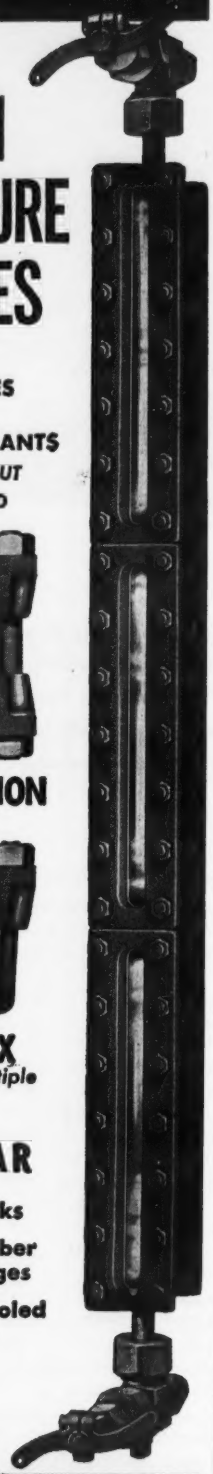
THRU VISION

REFLEX
Single or Multiple Sections

TUBULAR

Gauge Cocks
•
Large Chamber Reflex Gauges
•
Heated or Cooled Gauges

SEND FOR **COMPLETE CATALOGUE**



STRAHMAN VALVES, Inc.
16 Hudson St., New York 13, U.S.A.

Check 3649 opposite last page.

Synthetic rubber gloves give extra-long wear, resist punctures

Recommended for aromatic and aliphatic hydrocarbons

Uses: For protecting hands from industrial greases, oils, solvents, and chemicals; especially recommended when handling aromatic and aliphatic hydrocarbons.

Features: Compounded to give extra-long wear, product has exceptionally good resistance to abrasion, punctures, snagging, and extreme temperatures.

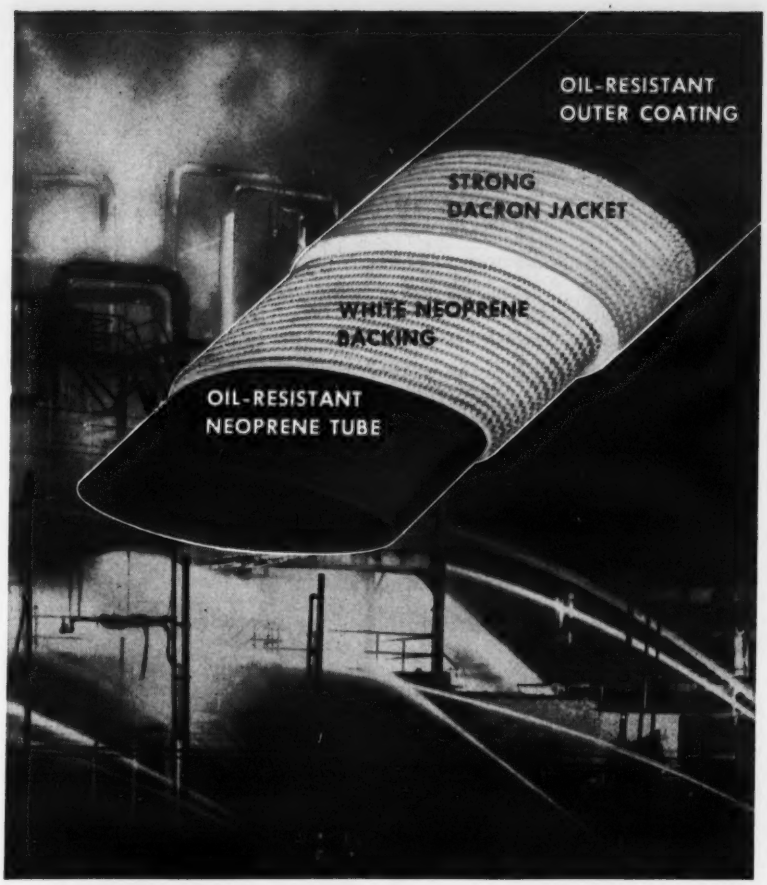
Buna-N synthetic rubber gloves are especially recommended for use with aromatic and aliphatic hydrocarbons

Description: Buna-N synthetic rubber gloves are available in sizes 7 through 9, in light and medium weights; sizes 9, 10, and 11, in heavy and extra heavy weights. All gloves are made to provide firm, non-slip grasp.

(Wil-Gard Buna-N synthetic rubber gloves are product of the Wilson Rubber Company, Div. of Becton, Dickinson and Company, 1200 Garfield Ave., S. W., Canton 6, Ohio.)

Check 3650 opposite last page.

"Why not use the same cigarette burn each time?"



Strong, light, flexible Petrochem Fire Hose RESISTS CHEMICALS AND OIL

QUAKER PETROCHEM is the first fire hose made *especially* for the chemical and petroleum industries. Rugged and reliable, it's engineered to take the worst abuses these industries have to offer.

DURABLE • PETROCHEM hose stands up to abrasion and weather, because it's sheathed in a tough, flexible jacket of DuPont "Dacron", impregnated with oil-resistant neoprene.

STRONG • Functions safely under high pressure (up to 500 psi) and excessive heat (up to 300° F).

CHEMICAL- AND OIL-RESISTANT PETROCHEM defies deterioration, both inside and out. Good resistance to acids, alkalies, and oxidants.

FLEXIBLE • Takes tight twists or knots without injury.

EASILY COILED • Saves storage space and time. PETROCHEM can be kept coiled or folded wherever needed.

ALL-PURPOSE PETROCHEM hose can be used in virtually *every* industry where fire-safety counts. For details, ask your Quaker industrial distributor, who offers you fast service and delivery—and the answers to hose and belting problems you may not even know you have. For his name, write *Quaker Rubber Division, H. K. Porter Company, Inc.; Philadelphia 24, Pa., or Pittsburg, California.*

H. K. PORTER COMPANY, INC.
QUAKER RUBBER DIVISION

Check 3651 opposite last page.

DRY AIR . . .
PRECISELY as you want it

- to control your product's quality
- to prevent condensation on your product or material
- to prevent changes due to moist air in contact with your product
- to protect your material from dampness
- to protect your processing of moisture-sensitive material
- to DRY your material or product
- to pack or store your product safe from moisture damage
- to get exact moisture control for the precise atmosphere condition you need
- to provide precise atmospheric conditions for testing
- to increase your air conditioning capacity
- to DRY large quantities of fresh air from outdoors

The Niagara's Controlled Humidity Method using HYGROL moisture-absorbent liquid is

Best and most effective because . . . it removes moisture as a separate function from cooling or heating and so gives a precise result constantly and always. Niagara machines using liquid contact means of drying air have given over 20 years of service.

Most reliable because . . . the absorbent is continuously reconcentrated automatically. No moisture-sensitive instruments are required to control your conditions.

Most flexible because . . . you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

Easiest to take care of because . . . the apparatus is simple, parts are accessible, controls are trustworthy.

Most compact, taking less space for installation.

Inexpensive to operate because . . . no re-heat is needed to obtain the relative humidity you wish in normal temperature ranges and frequently no refrigeration is used to remove moisture.

The cleanest because . . . no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.

Niagara Controlled Humidity Air Conditioning

This method removes moisture from air by contact with a liquid in a small spray chamber. The liquid spray contact temperature and the absorbent concentration, factors that are easily and positively controlled, determine exactly the amount of moisture remaining in the leaving air. Heating or cooling is done as a separate function.

Write for full information; ask for Bulletins 112 and 121. Address Dept. CP-2

NIAGARA BLOWER COMPANY
405 Lexington Ave., New York 17, N. Y.
District Engineers in Principal Cities of U. S. and Canada

Check 3652 opposite last page.

Switching from batch to continuous processing can pay dividends in more ways than one. Royce Chemical converted their filtering operation, found that the continuous unit not only speeds processing, reduces labor and maintenance costs, but also . . .

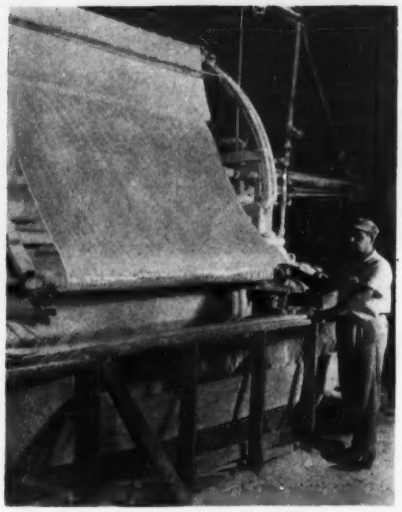
TED F. MEINHOLD, Associate Editor
With **HERMAN A. NELSON,** Production Engineer
Royce Chemical Co., Carlton Hill, New Jersey

Problem: An easier and more efficient way of filtering and washing by-product zinc oxide slurry was sought by Royce Chemical Company, Carlton Hill, New Jersey. The conventional filter press used in the operation did not achieve the level of washing required, due largely to agglomerated lumps and channeling of the wash liquids. Furthermore, the large amount of manual labor required added a discouraging burden of costs to the operation.

Royce is one of the largest producers of sodium hydrosulfite and sodium sulfoxylate formaldehyde, both of which are widely used in the dyeing and bleaching of textiles and related applications. Royce produces the compounds by reducing aqueous sulfite solutions with high-purity zinc dust. The zinc hydrosulfite which is initially produced is converted to sodium hydrosulfite and zinc carbonate by reaction with soda ash.

Zinc oxide is obtained by firing the zinc carbonate, obtained as by-product in the previous reaction.

Solution: Feeling that a continuous filter that provided intensive means for washing the filter cake might solve the problem, Royce consulted with Filtration Engineers, Inc., Newark, N. J., leading designers and manufacturers of continuous filtration equipment. On the basis of laboratory tests, it was concluded that a rotary-drum



Zinc oxide cake, produced by rotary-drum vacuum-filter, is an upgraded by-product of sodium hydrosulfite manufacture. When dried, product assays over 98% ZnO

Cake is lifted from filter drum by string discharge mechanism

UPGRADES BY-PRODUCT ZINC OXIDE

vacuum-filter equipped with wash and compression mechanism, and a continuous string discharge, could not only do the job, but would produce a better product as well.

The filter they installed was fabricated from mild steel and cast iron. It has an 8′-diam drum with a 7′4″ face — giving it 184 sq ft of filtering area. Drum rotates one revolution per five minutes, in a slurry tank provided with an agitator and liquid level float control.

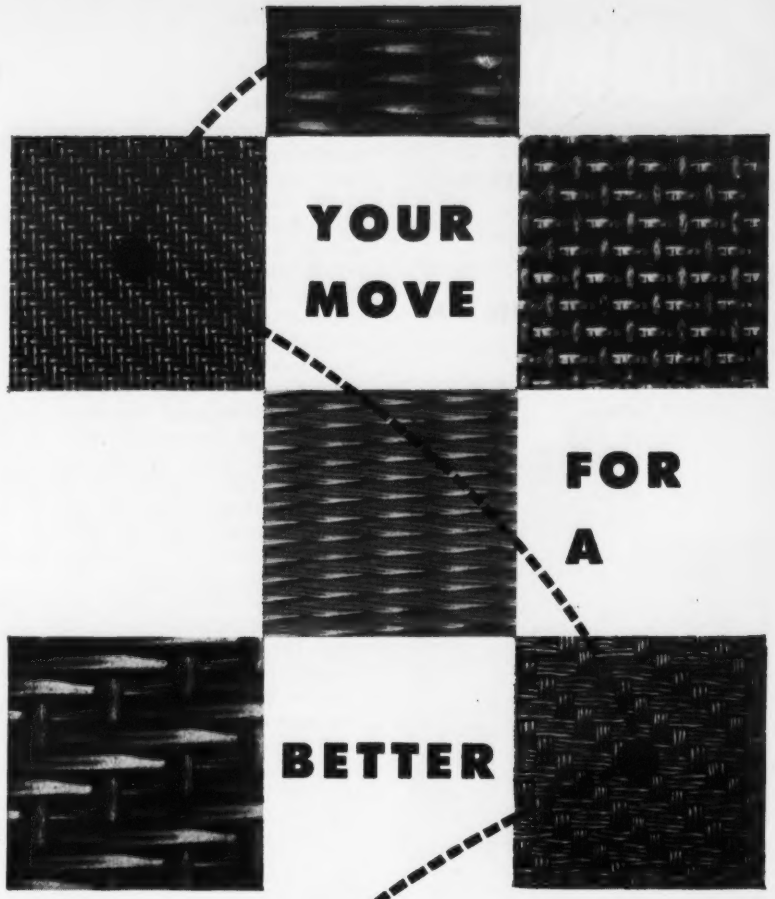
Surface of drum is divided into shallow compartments connected by pipelines to an automatic valve so that vacuum can be applied to each individual compartment in proper sequence. A spiral drainage member made of 304 Stainless screen separates cloth from drum so that there is space for the liquid to drain from all parts of the compartment into the suction line.

Wash mechanism consists of a highly absorbent endless felt wash blanket which presses against filter cake after it emerges from the slurry. Blanket is flooded from above by non-atomizing water distributors which virtually submerge blanket and cake.

After passing through washing arc the cake is dewatered by suction and compression beneath the blanket and series of compression rolls that ride over the blanket. Use of blanket and compression insures a wash that is uniform and non-channeling, and a dewatering cycle that prevents voids and results in maximum liquid removal.

The cake, compressed and free of cracks, is about ⅜″ thick.

It is lifted from drum by string discharge mechanism which consists of a series of 192 individual linen strings, each placed ½″ apart and tied to make them into a broad, endless belt the width



Metallic Filter Cloth

NEWARK for ACCURACY

For the most uniform, most accurate metallic filter cloth, specify NEWARK. All weaves, all metals for all types of service, there's a NEWARK filter cloth engineered to meet your requirements. Send for our New Catalog E.

Newark Wire Cloth COMPANY

351 Verona Avenue • Newark 4, New Jersey

Check 3653 opposite last page.

of the drum.

As filter rotates, strings pass over drum, then lift cake free from surface of filter cloth and carry cake down over discharge roll. There the strings and filter cake make an abrupt bend which breaks up and dislodges cake.

Cake drops through chute to endless belt of dryer on floor below. Strings then pass through an aligning comb and are guided back on the drum by means of the return roll.

Results: The continuous vacuum filter produces a white, uniform cake of zinc oxide, meeting even the most rigid standards of the rubber and rayon industries. The dried cake assays over 98% ZnO. When dried, pulverized, and bagged, production is about 20 tons per day.

Since the cake produced on the new filter contains less than 50% moisture and approximately 20% less moisture than the cake obtained on the old filter press, drying is much more economical. Savings amount to about 200 Btu per pound of ZnO. This saving, though important, was by no means the major saving that resulted. The old filter press required three operators per 24 hours, with maintenance extra. In contrast, the rotary vacuum unit requires virtually no labor. A few times a day a worker, engaged in other activities, makes a momentary inspection.

The new filter has operated, without interruption, 24 hours per day, 351 days per year, save only for about 2 hours downtime per month to change filter cloths. The linen strings on the string discharge have a life of 1 to 2 months, with one string being replaced at a time as needed.

Maintenance on the old units amounted to approximately $10,000 per year. This figure alone has amortized the new vacuum filter and auxiliary equipment in 2½ years.

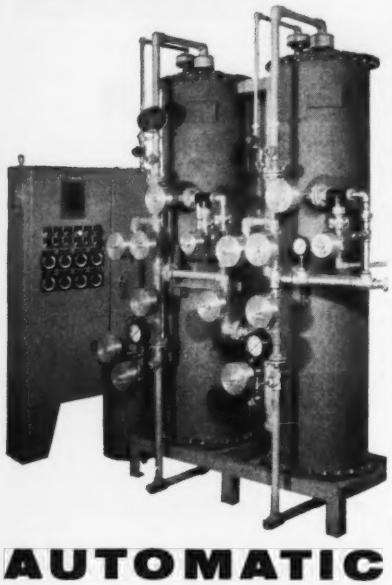
(Further information about continuous vacuum filters can be obtained from Filtration Engineers, a Division of American Machine and Metals, 157 Oraton St., Newark, N. J.)

Check 3655 opposite last page.

ILLCO-WAY ionXchange

NOW!

NEW IDEAS IN AN EFFICIENT . . .



AUTOMATIC DE-IONIZER

New, simplified, pneumatic ILLCO-MATIC valve-operators, designed and built especially for this service, are featured on the two-bed Automatic De-Ionizer shown above. *ILLCO-WAY Two-Bed or Mixed-Bed De-Ionizers, equipped for automatic operation, can be built to any service or cycle your processes require.*

EASILY ADJUSTABLE

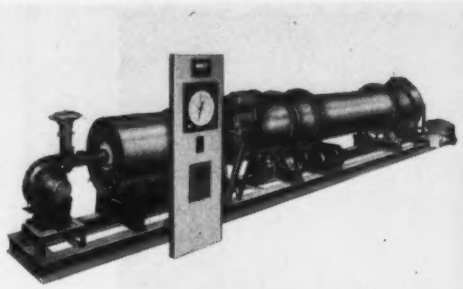
The control panel for ILLCO-WAY Automatic De-Ionizers features a set of adjustable Timers, one for each operation. Instant readjustment of the time of any cycle is thus possible, giving the user full flexibility to meet any conditions. Automatic sensing devices can be set to start the regeneration cycle under any specified requirements. *For further details, consult your ILLCO-WAY representative, or write to . . .*

ILLCO-WAY | ILLINOIS WATER TREATMENT CO. 840 Cedar St. Rockford, Ill.

NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Ont.

Check 3654 opposite last page.

2' 3" Diameter x 16' long
DAVENPORT ROTARY
FLASH FIRED DRYER



DAVENPORT
PRESSING – DRYING and COOLING Equipment
Continuous DeWatering Presses
ROTARY DRYERS Steam Tube, Hot Air and Direct Fire
Atmospheric DRUM DRYERS
ROTARY COOLERS Water and Air

DRYING ASBESTOS

The above photograph shows a 2'-3" x 16'-0" DAVENPORT Rotary Flash Dryer for drying asbestos. This is a package unit fired with natural gas, with complete automatic controls. Furnace output 1,250,000 B.T.U.

Let our engineers consult with you on your Pressing, Drying and Cooling problems or send for our catalog C. For quick reference consult your Chemical Engineering Catalog.

DAVENPORT MACHINE AND Foundry Company
Davenport, Iowa, U.S.A.

Check 3656 opposite last page.

RIETZ
ADVANCED EQUIPMENT FOR

SIZE REDUCTION
DISINTEGRATORS
PREBREAKERS
for
Pulverizing
Crushing
Disintegrating
Cutting
Homogenizing
Delumping
Fiberizing
Shredding
of
Fine or Coarse
Wet or Dry
Solids and/or Liquids

MIXING
DISINTEGRATORS
for Continuous Mixing and Blending of Solids with Solids; for Suspending and Dispersing Solids in Liquids.
EXTRUCTORS
for Continuous Mixing of Solids and Liquids to produce Heavy Pastes or Plastic Masses.
THERMASCREWS
for Batch Blending of Solids with Liquids with simultaneous Heating or Cooling.

HEAT EXCHANGE
THERMASCREWS
for Cooling of Dry Solids from High Temperatures *(above 1000° F)*; utilizing Minimum Space; eliminating Dust Losses; for a wide range of special Heat Exchange applications—Heating, Drying, promoting Chemical Reactions, etc.

LABORATORY FACILITIES ARE AVAILABLE TO THE Chemical Industry at both Santa Rosa, Calif., and West Chester, Penn., for the testing of your product with Rietz Equipment on all of these unit operations.

Send for new Rietz "Engineering Report on Mixing"

Rietz MANUFACTURING CO.
Santa Rosa, Calif. • West Chester, Penna.

Check 3657 opposite last page.

Wet-type dust collector has no moving parts

Uses: Removing dust and other foreign particles from air and gas streams.

Features: Dust collector is compact, efficient, and can be used on broad range of applications. No moving parts are present within collection area.

Description: Unit is primarily designed for use where more than one dust collector will be used or wherever a common settling tank or sludge basin is employed.

The dust collector operates on wet scrubbing principle. Glass spheres are used in separation action and only minimum amount of water is consumed. Interior surface is continually flushed, resulting in constant high level of efficiency over wide range of load variations. Absence of baffles or "dead areas" make unit easy to maintain over relatively infrequent intervals.

(Type IC hydro-filter is product of National Dust Collector Corporation, 700 Machinery Hall, Chicago 6, Illinois.)

Check 3658 opposite last page.

Condenser ejector field entered by company

Southwestern Engineering Company is now designing and producing a full line of vacuum equipment, including surface condensers, steam jet ejectors, and an ejector-condenser combination unit.

(Further information may be obtained from Southwestern Engineering Co., 48th and Santa Fe Ave., Los Angeles, California.)

Check 3659 opposite last page.

Agitating equipment

Equipment added to manufacturer's line of laboratory and production agitators is featured in 16-page Pneumix cat — Eclipse Air Brush Company, 390 Park Ave., Newark 7, N. J.

Check 3660 opposite last page.

$80.00 SAVED

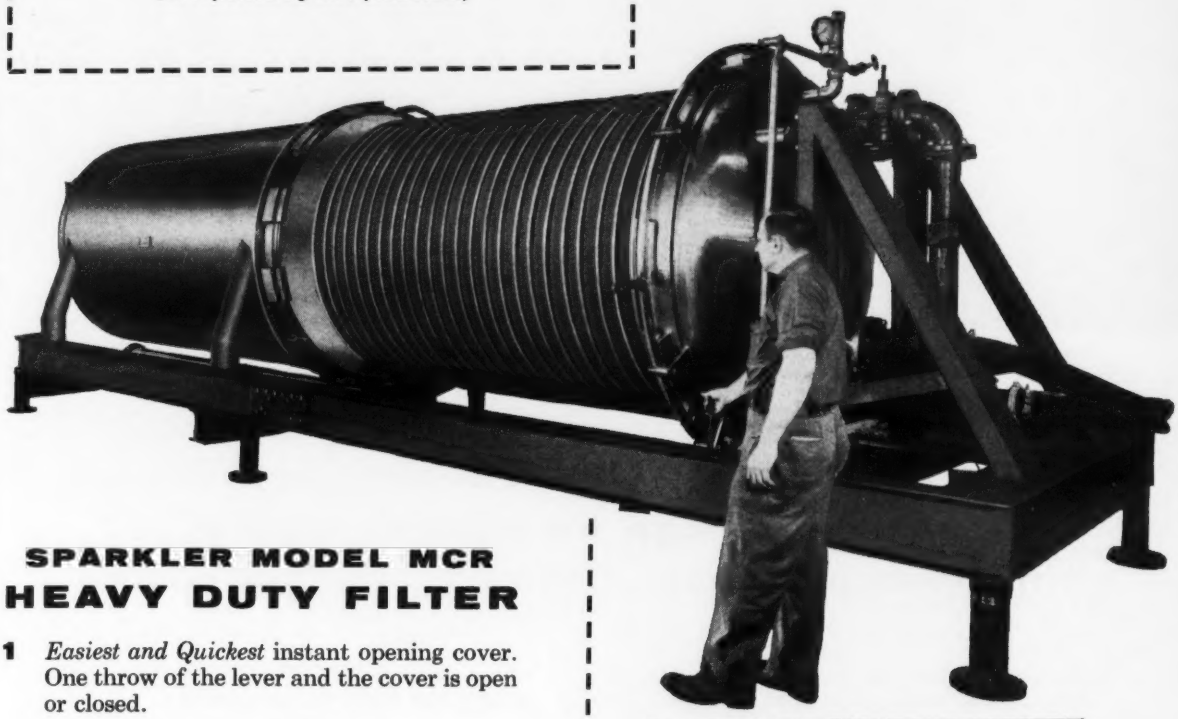
EVERY DAY IN MAN HOURS ALONE WITH THIS FILTER

(as reported by one processor)

Built to handle products with a high percentage of solids, with long operating cycles.

Engineered to lower filtration costs.
Fast cleaning with a minimum of down time.

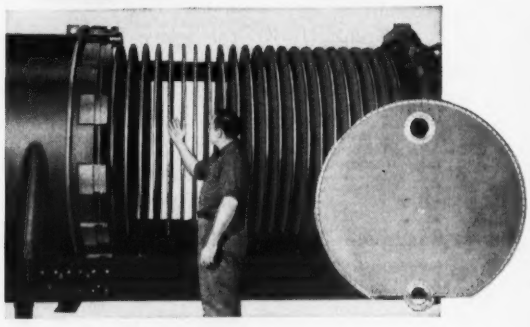
Anyone interested in reliable uniform quality, highest daily volume production, and economical operation, will not be satisfied with anything less than a Sparkler MCR.



SPARKLER MODEL MCR HEAVY DUTY FILTER

1. *Easiest and Quickest* instant opening cover. One throw of the lever and the cover is open or closed.
2. Retractable tank, hydraulic power operated with finger tip control.
3. No breaking of pipe connections with fixed head. No spillage.
4. Plates spread far apart to allow full size cake without clogging. Large top plate outlet and bottom drainage outlet reduces flow resistance.

Write for complete facts in bulletin



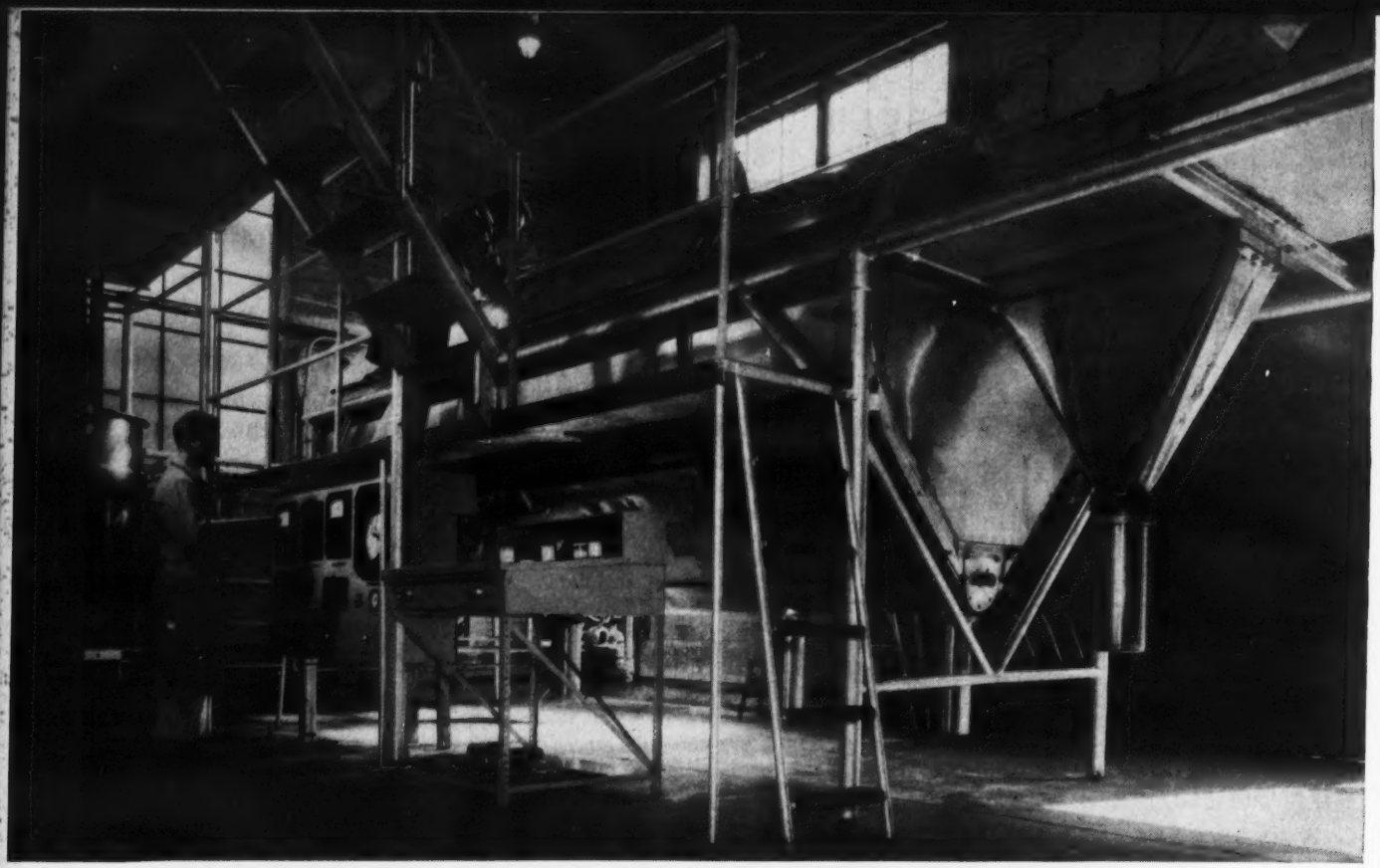
SPARKLER FILTERS

SPARKLER MANUFACTURING COMPANY
Mundelein, Illinois

Sparkler International Ltd. plants, in Canada, Holland, Italy and Australia

Exclusive filtration engineers for over 30 years

Check 3661 opposite last page.



RUNNING SPRAY DRYING TEST IN BUFLOVAK'S PROCESSING LAB. The lab contains a complete line of small scale and pilot size processing equipment for investigating drying, evaporation, extraction, impregnation, crystallization, and other processes. Here you can test a few beakers of material or run tank car quantities on a full time production scale.

Buflovak Spray Dryers—new horizontal high velocity design for instant drying... improved products...lower operating costs

Whether it's food or chemicals, Buflovak flash drying gives products new, more marketable characteristics.

Buflovak Horizontal Spray Dryers convert a liquid to a dry product instantaneously. Short exposure to heat helps to retain all the desirable product characteristics. Particle size and shape can be selected and controlled. The finished product is continuously removed and discharged from one point.

Compactly designed, these dryers require little headroom, keep initial and operating costs low. Complete accessibility makes between-batch cleaning easy and economical. Buflovak Spray Dryers offer a choice of high efficiency powder collecting systems best suited to your product.

Test your product in the Buflovak customer service laboratory

It's easy to check your product by running a test in the lab spray dryer. Here you can work with skilled engineers to obtain accurate performance data and actual samples of your spray dried product . . . see particle characteristics . . . examine process efficiency.

Contact Buflovak's research department for details on the facilities and services available to you.

BLAW-KNOX

BLAW-KNOX COMPANY
Buflovak Equipment Division
1645 Fillmore Avenue, Buffalo 11, N.Y.

THAT'S INTERESTING

Slow Photo

Time-lapse photos of the reaction of corrosive gases on the surface of a solid are being used to measure rate of reaction. National Bureau of Standards has used this system to record the progress of reaction of nickel with chlorine to form gaseous nickel chloride in temp range of 1100° to 1700°K. Studies of gas-solid reactions could be useful in finding out more about mechanism of corrosion.

Big Package

Each year $88 is spent for packaging for each man, woman, and child living in the United States. Each one of us will use on the average 676 folding boxes, about 113 glass containers and 236 metal cans during a 12-month period. To gain perspective we can compare it with passenger auto business representing $9.5 to $10 billion, or the entire paper industry rated at a little less than 11 billions.

For more information on product at left, specify 3662 see information request blank opposite last page.

Shelf, manifold connections placed outside chamber of vacuum dryer

Avoids possibility of leaks developing within chamber

Uses: For safe, rapid drying of heat-sensitive, air-sensitive, or pyrophoric materials.

Features: All shelf and manifold connections are placed outside chamber, avoiding possibility that leaks might develop within chamber and disturb vacuum or contaminate product being dried. Maintenance is also simplified.

Description: Shelves of vacuum shelf dryer are rated at 50 psig, and undergo hydrostatic tests before and after assembly at 100 psig. Chamber is constructed entirely of welded steel for maximum safety and dependability under full-vacuum operation.

Dryers are available with shelf sizes from 24 x 24″ up to 60 x 80″. Any desired number of standard shelves can be inserted in chambers according to requirements. Heating by hot water, steam, or special heat transfer fluids can be provided.

(Model 238 vacuum shelf dryer is product of Vacuum Equipment Division, F. J. Stokes Corporation, 5500 Tabor Road, Philadelphia 20, Pennsylvania.)

Check 3663 opposite last page.

Giant all-glass column has 12 bubble plates, is 16 feet high

Believed to be largest of its kind ever built

Glass-constructed processing equipment is getting bigger and better. Latest example is giant all-glass bubble-cap distillation column manufactured by Corning Glass Works. Measuring 16 ft high, unit has 23½″ diam, and weighs approximately 2000 lb.

Thirteen armored Pyrex brand cylindrical sections make up the tower. Included are two end pieces and 11 pieces with four-inch conical

Pays for itself in Savings!

Lapp PULSAFEEDER

CONTROLLED-VOLUME CHEMICAL PUMP

NO LEAKAGE
NO CONTAMINATION
NO PRIME LOSS
NO STUFFING BOX

The moment your new Pulsafeeder is put into operation, you're on the way to real savings . . . savings that can eventually result in the Pulsafeeder paying for itself.

Lapp Pulsafeeder, the chemical pump with *no stuffing box*, is a piston-diaphragm pump providing *positive displacement* by a piston pumping a hydraulic medium working against a diaphragm. The diaphragm isolates the chemical being pumped from the working pump parts . . . eliminates need of stuffing box or running seal . . . prevents corrosion. Maintenance costs are reduced to next to nothing—there are practically no repairs or replacement of parts with a Pulsafeeder. You'll save, too, by elimination of product loss due to leakage or contamination. In the long run, Pulsafeeder is the safest, surest and lowest cost controlled-volume chemical pump. To prove our stand, we'll be happy to quote actual maintenance costs taken from recorded case histories.

WRITE FOR BULLETIN 440 ***with typical applications, flow charts, description and specification of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Div., 538 Poplar St., Le Roy, N. Y.***

Lapp

Check 3664 opposite last page.

FOR PRECISION MIXING...

Specify
MixMor

- Gear, direct, variable speed and air drive models
- Standard speeds from 25 to 1800 RPM
- ¼ to 3 HP
- Totally enclosed and explosion-proof motors
- Stainless steel and special alloy models

MixMor mixers are available in portable and top entering models to meet the most exacting requirements... quick delivery made from stock. For complete specifications on the MixMor for your job, write:

MixMor INC.
factory and sales office
3139 Casitas Ave., Los Angeles 39, Calif.

Check 3665 opposite last page.

MAISCH
METERING PUMPS

- STAINLESS STEEL — OILLESS BEARINGS — STERILIZABLE
- POSITIVE DISPLACEMENT — SMOOTH, NON-PULSATING FLOW
- FOR HOT, COLD, VISCOUS OR WATERY FLUIDS
- ACCURATE WITHIN 1 TO 2%

Maisch Metering Pumps are simple in design, ruggedly built for long service, and can be depended on to maintain accuracy indefinitely. Exclusive design features insure optimum performance. Particularly suited for handling chemicals, syrups, oils, glue, processing solutions, etc. Quick demountable or fixed heads. Fixed capacity pumps available in wide range of output. Pumps in stock for immediate delivery. Sanitary Metering Pumps available in capacities to 76 gph. meet all existing sanitary requirements. Write for complete details.

MECHANICAL PRODUCTS CORPORATION
174 North Ogden Avenue • Chicago 7, Illinois

Check 3666 opposite last page.

pipe flange connections. Sections and plates are placed one atop the other, with the unit being held together by tie rods. Teflon gaskets are placed between sections.

The column's 12 bubble plates are made of Vycor

All-glass distillation tower is made up of 13 armored Pyrex brand sections

brand glass, a 96% pure silica glass. Plates weigh about 65 lb each.

The distillation column is believed to be the largest of its kind. Previous units of same diam have contained, at the most, six glass plates. The giant column is the first of two ordered by a chemical firm for use in manufacturing metallic silicon. Glass was specified to meet rigid purity requirements.

(Further information about glass-constructed distillation columns may be obtained from Corning Glass Works, Corning, New York.)

Check 3667 opposite last page.

Handling costs cut 300% by mechanical screen

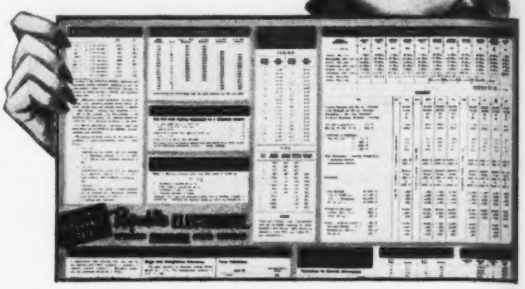
Features eccentric gear for high-speed production

Uses: Separating various solid materials in chemical and allied industries.

Features: According to manufacturer, unit will reduce handling costs up to 300%.

Description: Mechanical separator is fabricated of heavy steel construction and measures 96 x 80 x 37 inches.

FACTS! FIGURES! DATA!
Get this Chart
FREE!



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WELDED STAINLESS STEEL TUBING AND PIPE
This big, 18½ x 20½" wall chart is yours for the asking. Decimal equivalents, tolerances, chemical analyses, physical properties . . . facts, and figures for all sizes and shapes of Republic ELECTRUNITE® Welded Stainless Steel Tubing and Pipe. Attractive, easy to read. Write today!

REPUBLIC STEEL
STEEL AND TUBES DIVISION
207 East 131st Street • Cleveland 8, Ohio

Check 3668 opposite last page.

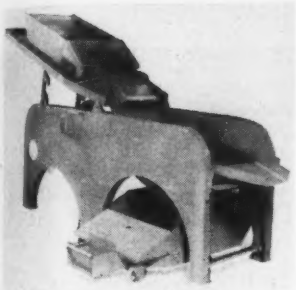
ERTEL ASBESTOS
FILTER SHEETS
. . . *Used where performance counts!*

Available in ten uniform grades for all filters up to 25" square. Manufactured under rigid control and acid treated to meet Ertel standards of low leachable calcium and iron content. Sheets are checked constantly by a reputable analytical laboratory—copies of their reports are available.

ERTEL ENGINEERING CORP.
KINGSTON 3, NEW YORK

Try Ertel sheets without obligation, on your next filtration run. We will test filter your product at no charge in our laboratory in order to recommend the correct grade.

Check 3669 opposite last page.



Mechanical separator measures 96 x 80 x 37"

Unit has an adjustable stroke ranging from ¼ to 1¼ inches. Machine operates through an eccentric gear to achieve high speed production.

(Mechanical separator is product of Metal Finish, Inc., 412 Frelinghuysen Ave., Newark 12, N. J.)

Check 3670 opposite last page.

Filter withstands 2300°F

Description and specifications of air-filtering equipment are provided in eight-page folder. Ceramic filter can remove 99.5% of 0.3-micron particles from 2300°F air stream. "Airpure" filter cat — Flanders Filters, Inc., Riverhead, Long Island, N. Y.

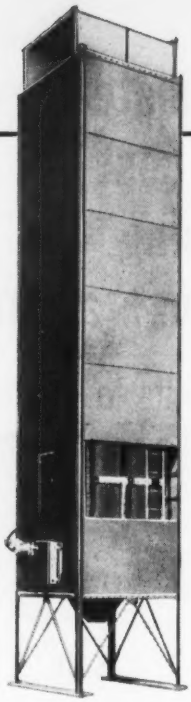
Check 3671 opposite last page.

"Well, you shoulda put the lousy meters where a guy can read 'em!"

The latest advancement in dust recovery

Dualaire*

JET-CLEANED DUST COLLECTORS



- *Cleans without jarring or rapping!*
- *Maintains uniformly low pressure drop!*
- *Field-proven efficiency as high as 99.99%!*

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Backed by the same organization that pioneered commercial application of COTTRELL Precipitators and MULTICLONE Collectors, the DUALAIRE Jet-Cleaned Dust Collector is revolutionizing filter-type recovery systems. The DUALAIRE gives you vital advantages like these . . .

JET-CLEANING ACTION clears the filter tube continuously in small increments—not with sudden surges as in rapping or jarring.

CLEANING ACTION starts automatically and stops automatically to keep pressure differential within low pre-set range.

FILTER EFFICIENCIES under actual field operations, run as high as 99.99%. And filter capacity remains uniformly high at all times because no thick filter cake ever forms to reduce effectiveness!

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FILTER UNITS LAST LONGER because they are not subjected to intermittent jarring, rapping or vibration—all destructive to filter fabrics.

The above are only a few of the many important advantages you get in DUALAIRE Dust Collectors. This 8 page booklet gives the full story . . . explains how the jet-cleaning action works — shows how the basic DUALAIRE unit is adaptable to a wide range of operating requirements — provides facts, figures and illustrations that will change your thinking on filter-type recovery systems. Send for your free copy of this descriptive booklet — or see your nearest Western Precipitation representative.

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Now, thanks to Narda's mass production techniques, you can get top ultrasonic cleaning equipment with a full two year guarantee, at the lowest prices in the industry! What's more, Narda's SonBlasters are available now — off-the-shelf — for immediate delivery! Here's your opportunity to start saving immediately on labor, chemicals and floor space — not to mention improved cleaning with fewer rejects.

Simply plug this new Narda SonBlaster into any 115 V-AC outlet — fill the tank with the cleaning solution of your choice and flip the switch. In seconds, you are cleaning everything from hot lab apparatus to medical instruments, optical and technical glassware to clocks and timing mechanisms, electronic components and semiconductors to motors, relays and bearings. In short, you will clean 'most any mechanical, electrical, electronic or horological part or assembly you can think of—and clean it faster, better and cheaper. In addition, Narda SonBlasters are ideal for brightening, polishing, decontaminating, sterilizing, pickling, and plating; emulsifying, mixing, impregnating, degassing, and other chemical process applications.

Write for more details now, and we'll include a free questionnaire to help determine the precise model you need.

Narda SonBlasters—a complete line of production-size units with the quality, power, performance, capacity and appearance of cleaners selling up to three times the price. From $175 to $1200.

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SPECIFICATIONS

Inside tank dimensions: (Model NT-602) 9¼" l, 6" h, 5" w; one gallon capacity; stainless steel. **Generator:** 10" l, 8½" h, 9½" w; 115 V-AC; Selector switch for alternating between two tanks. **Complete unit is portable and compact.**

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cp FOR THE LABORATORY

Increasing use of tritium (radioactive hydrogen of mass 3) for analytical work in radioactive tracing has been catalytically promoted by liquid scintillation spectrometer. . . . New England Nuclear Corporation even uses the instrument in production-line methods for analyzing tritium-labeled compounds . . .

liquid scintillation spectrometer simplifies tritium analyses

WILLIAM C. CLARKE, Assistant Editor
with **DR. SEYMOUR ROTHCHILD,**
Technical Director
New England Nuclear Corporation

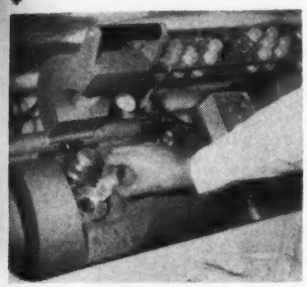
Increasing use of liquid scintillation spectrometer has acted catalytically in promoting use of tritium as radioactive tracer. Drawbacks in the use of tritium have been eliminated to a great extent . . . even to the point where radioactive tracer labeling can now be put on a production-line basis.

Typical of the problems that face users of tritium was the experience of a supplier of tritium-labeled compounds to industry, New England Nuclear Corporation of Boston, Massachusetts.

With the recent price reduction from $100 a curie to $2 a curie, NENC has observed a burgeoning increase in the use of tritium compounds. As NENC guarantees specific activity, each lot of labeled compounds shipped by the company must be radioassayed, which means a great number of samples must be counted on a routine basis with as little difficulty as possible. Had the liquid scintillation equipment, the Tri-Carb Spectrometer, not been available, this would have been a difficult task.

Scintillation spectrometer (at left) measures beta particle emission from sample contained in freezer (at right). Operator notes number of counts per unit of time. Statistical comparison of counting results indicate course of reaction mechanism, or other analytical information desired

Operator places sample in chamber inside freezer. Optical shutters protect photomultipliers from exposure to room light when sample chamber is opened



Drawbacks in the use of other methods than liquid scintillation counting for analyses of tritium are that they are relatively laborious, not readily suited for other than single analyses. Other techniques of gas counting, either proportional or ionization chamber counting, require destruction of the sample in its conversion to water and carbon dioxide.

Liquid Scintillation Technique

Actual counting of tritium-labeled compound is simple. Sample is dissolved in suitable solvent, with a liquid scintillator. Detecting beta emission from sample, scintillator emits light according to beta energy level of sample. Photomultiplier tubes in liquid scintillation spectrometer convert these light pulses to electronic pulses and electronically amplify them, usually by a factor of several hundred thousand. After further amplification and pulse

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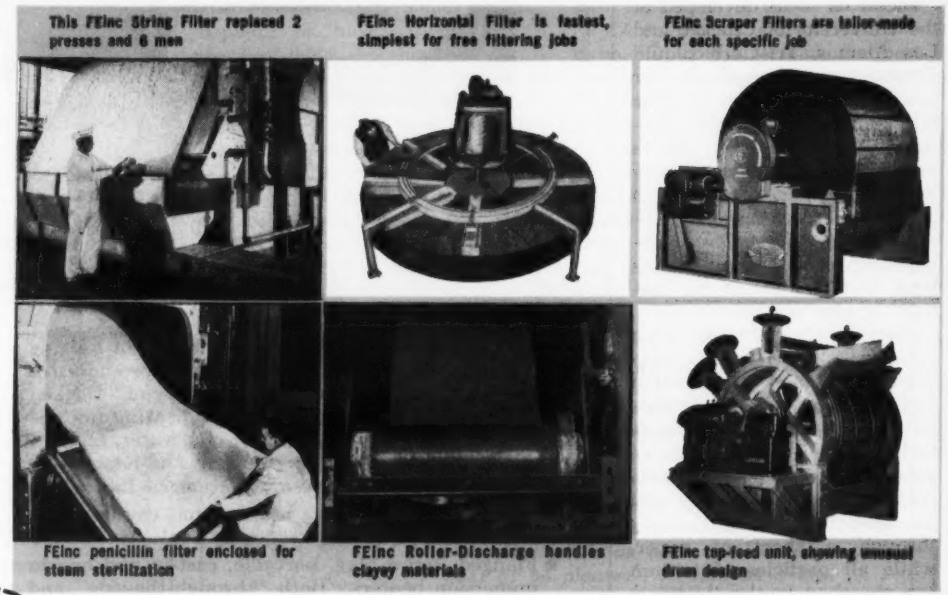
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height discrimination, count is read on scale by operator.

Two problems bother analysts using liquid scintillation technique. One is solubility, that is, finding a suitable solvent for the test sample. Second is problem of light quenching as scintillation counting process depends on detection of light emitted by scintillator when struck by a radioactive particle. Should final sample color be yellow (thus absorbing blue light from scintillator), light emitted by the scintillator in solvent system is lost and results are impaired.

Consequently, tritium users endeavor to employ certain solvents as toluene or dioxane. The quenching problem is reduced or eliminated by dilution of highly-colored samples and chemical conversion.

Counter Similar to Optical Spectrometer

Based on ideas developed at the University of Chicago and Los Alamos, Tri-Carb Liquid Scintillation Spectrometer used at New England Nuclear is similar to an optical spectrometer in that it allows measurement of beta-ray energy emission over a broad continuous spectrum. As maximum energy levels are characteristic of a particular isotope, identification of the isotope is also possible.

Most popular isotopes being counted by the liquid scintillation method are tritium and carbon-14, with maximum energies of 0.018 mev and 0.155 mev. These energies are such that most beta particles of carbon-14 would be absorbed in passing through a sheet of paper, while all particles of tritium are absorbed in the thickness of a sheet of cellophane.

Two problems result from such a weak level of energy emission; one of self-absorption, the other of passing radiation through a counter window. These effects make it difficult to measure accurately samples of carbon-14 with conventional Geiger counters and make it virtually impossible to count tri-

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tium externally. Liquid scintillation technique bypasses both these problems by placing sample in solution with a liquid scintillator.

Use of a freezer solves an instrumentation problem. Cooling the photomultiplier reduces number of thermionic pulses that would tend to override beta pulses. Design elements within instrument used at NENC further eliminate these effects. Two photomultipliers sort out noise and pass only beta pulses. Thermionic noise pulses occurring at random in the two photomultipliers are removed as only rarely do they chance to coincide in time.

Tritium's Popularity

Reason for tritium's present popularity is that it is relatively safe and available in large quantities at low cost. The Atomic Energy Commission expects a ten-fold rise in use of isotope materials by 1962. With continued expansion, production-line counting techniques will become even more common, such as New England Nuclear's use of a liquid scintillation spectrometer.

(Tri-Carb Liquid Scintillation Spectrometer is product of Packard Instrument Company, Inc., P. O. Box 428, La Grange, Ill.)

Check 3676 opposite last page.

(Information on tritium-labeled compounds is available from New England Nuclear Corp., 575 Albany Street, Boston 18, Mass.

Check 3677 opposite last page.

Temperature control

Handy 48-page pocket-size catalog illustrates and describes electric ovens, furnaces, baths, environmental cabinets, and manufacturer's related temperature control equipment for laboratory, pilot plant, and production. Cat M-57 — Blue M Electric Company, 138th & Chatham St., Blue Island, Illinois.

Check 3678 opposite last page.

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"See that booklet I'm holdin' in the picture of my library above. Well . . . Doerr published that a few months ago and, ever since, I've been callin' it a bank book.

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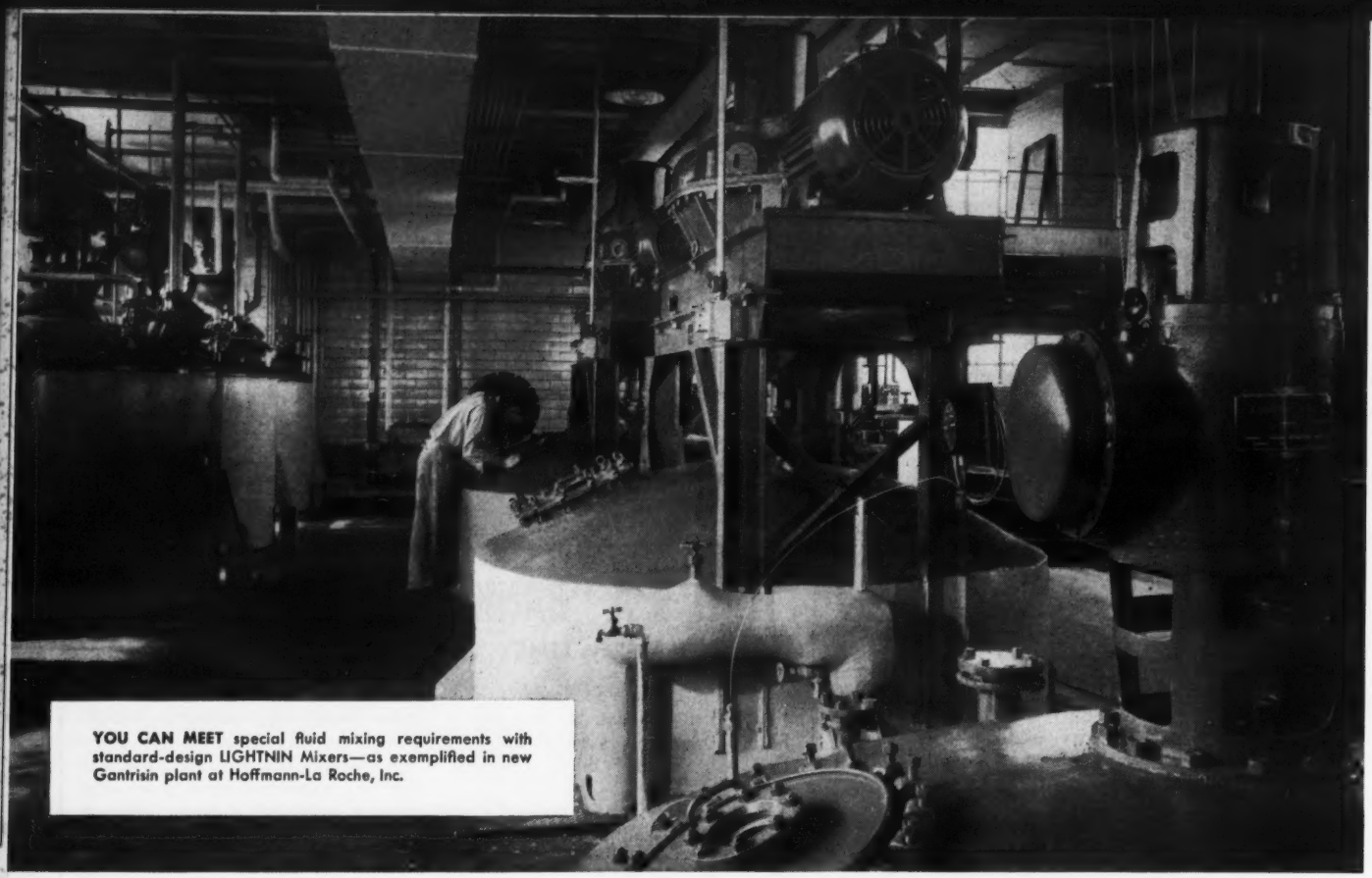

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The company has used LIGHTNINs for more than 20 years; currently has more than 200 in operation.

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Many aspects will be covered

The feature will cover such related aspects of material handling as management, engineering, purchasing, financing, trends, and new developments.

These aspects will be discussed by top men in both the chemical processing and material handling fields.

There will also be several case history stories telling how other companies have been able to realize savings with improved handling methods.

Since material handling ties in with practically all operations in the chemical processing plant, there will be something of interest for everyone.

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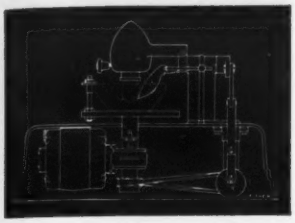

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Hazardous locations are no big problem for this balance

Uses: As laboratory balance in hazardous locations requiring equipment designed for Class 1, Group D installations.

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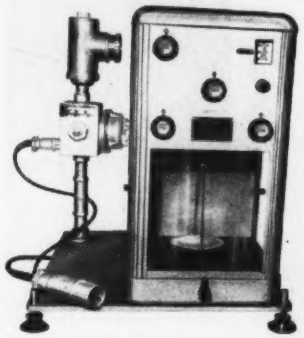

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All weights are built into balance. They are operated by knobs outside of case and totaled on an eye-level counter. Laboratory balance has capacity of 200 grams with sensitivity of 1/10 mg.

(Type SX explosion-proof balance is product of William Ainsworth & Sons, Inc., 2151 Lawrence St., Denver, Colo.)

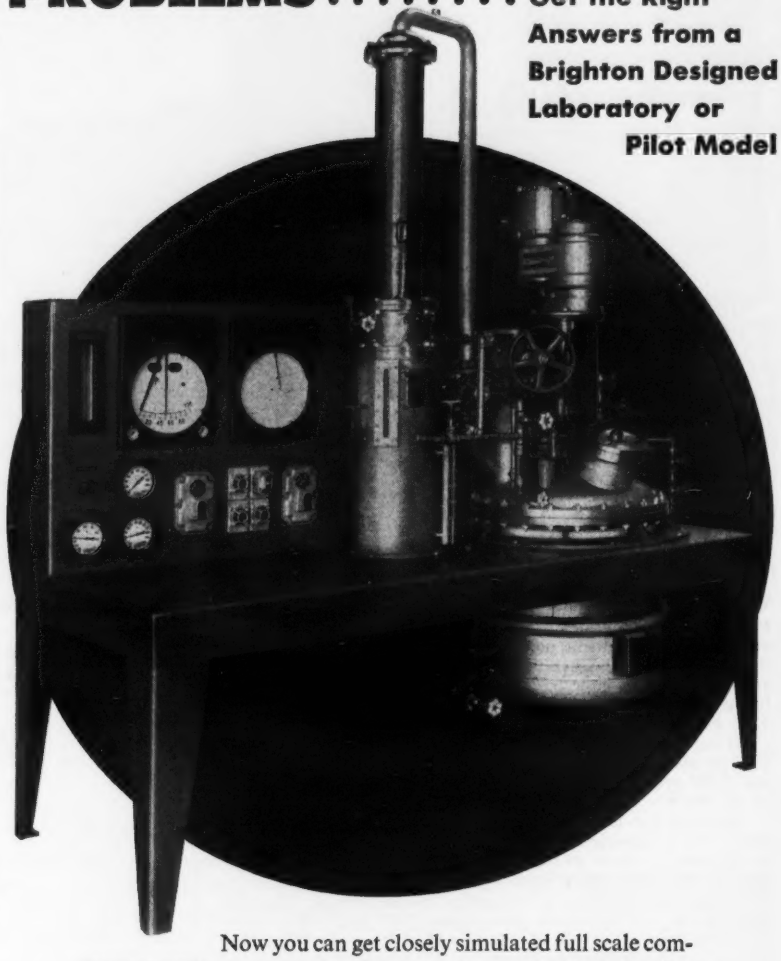
Check 3682 opposite last page.

Thermometers

Data sheet describes thermometer-thermoregulator, with magnetic adjustment, for use with any suitable relay. Thermometer bul — Chicago Apparatus Company, 1735 North Ashland Ave., Chicago 22, Ill.

Check 3683 opposite last page.

ELIMINATE PRODUCTION PROCESSING PROBLEMS . . . . . Get the Right Answers from a Brighton Designed Laboratory or Pilot Model



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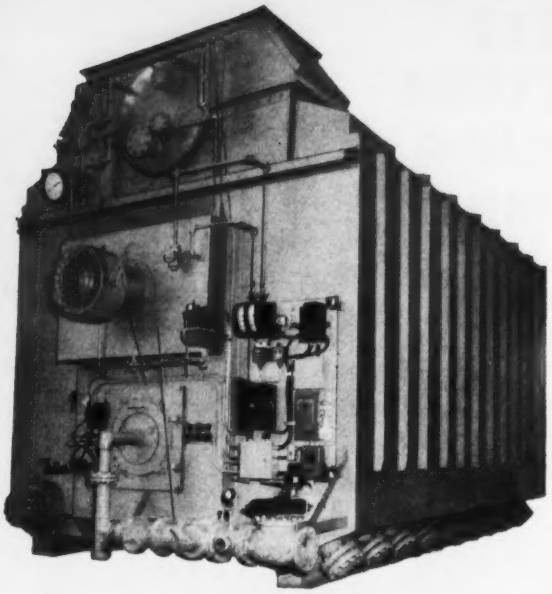

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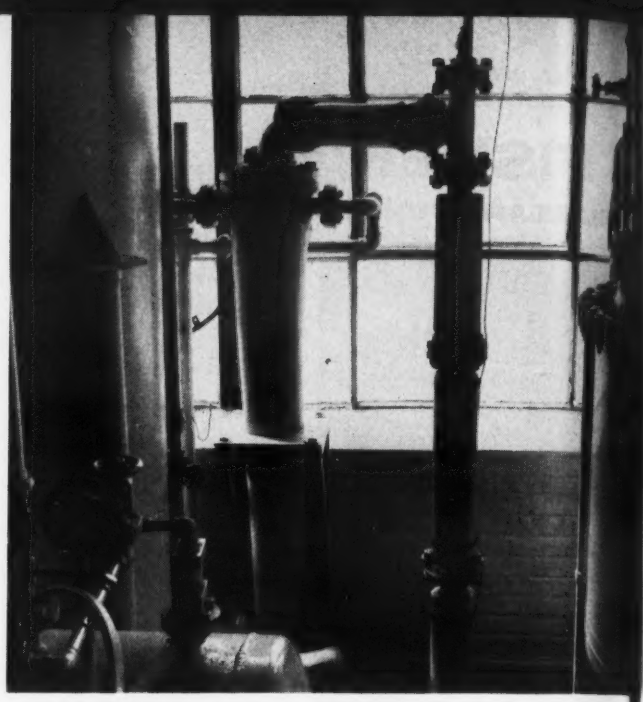
Check 3685 opposite last page.



Tantalum condenser on left (one of 17 used at Hoffmann-LaRoche) has reduced cooling water requirements by 90%

Increasing production was putting the squeeze on water supplies at Hoffmann-LaRoche. In one area where condensers required 40,000 pounds of cooling water per hour, company . .

slashes water needs 90% with tantalum condenser

Installation required only 36% of space formerly used

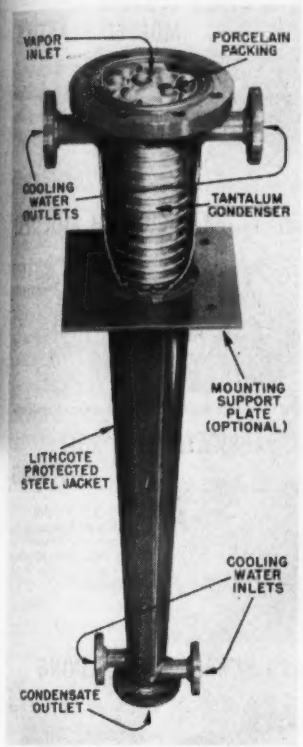
Problem: Condenser for an ethyl bromide, benzyl bromide, aqueous HBr mixture required a minimum of 40,000 pounds of cooling water an hour at Hoffmann-LaRoche, Inc., Nutley, N. J. During the summer, water requirements were considerably greater. With increasing manufacturing requirements for water putting the squeeze on available supply, conservation was a must.

Mixture results from a batch process requiring a time cycle of approximately 23 minutes. The HBr is separated from other products of reaction under partial vacuum and recovered for reuse. Cooling water temperature for condenser ranges from 3°C in winter to as high as 28°C in summer. Condenser in use was of acid-resistant construction with a heat-transfer area of 61 sq ft. Unit occupied approximately 16 cu ft of space.

Solution: A tantalum tapered condenser was installed for this process. Unit is 6″ x 2″ x 60″, has 5.23 sq ft of heat-transfer area, and occupies 5.8 cu ft of space. Condenser is of shell and tube design. Inner tantalum tube, through which vapor passes, is 6″ ID at large end, 2″ ID at small end, and 60″ long. It is constructed of 0.013″ tantalum sheet, ribbed to add strength and rigidity and impart turbulence to liquid film. Flow is counter current. Jacket is welded throughout and finished inside and outside with a baked phenolic resin finish.

Results: When cooling-water temperature is between 3 and 8°C, tantalum condenser uses approximately 4380 lb/hr, or 1679 lb per 23-minute batch. This is a decrease in water consumption of 90% over previously used condenser. Saving in water is about 15,000 lb (1800 gal) for each process batch. This saving is with cooling water at winter temperatures. In summer it is substantially greater.

Because high efficiency of condenser permits smaller unit to be used, a saving of 10.2 cu ft of plant space is realized.



Tapered design of condenser helps maintain close contact between vapor and condensing surface

Between 1948 and 1952, Hoffmann-LaRoche installed 16 similar condensers on processes where corrosion, product contamination, or undesired side reactions must be strictly avoided.

No failures have been reported. The only maintenance has been occasional cleaning and painting of exterior shells.

(Tantalum condensers are a product of Fansteel Metallurgical Corp., Chemical Equipment Div., North Chicago, Illinois.)

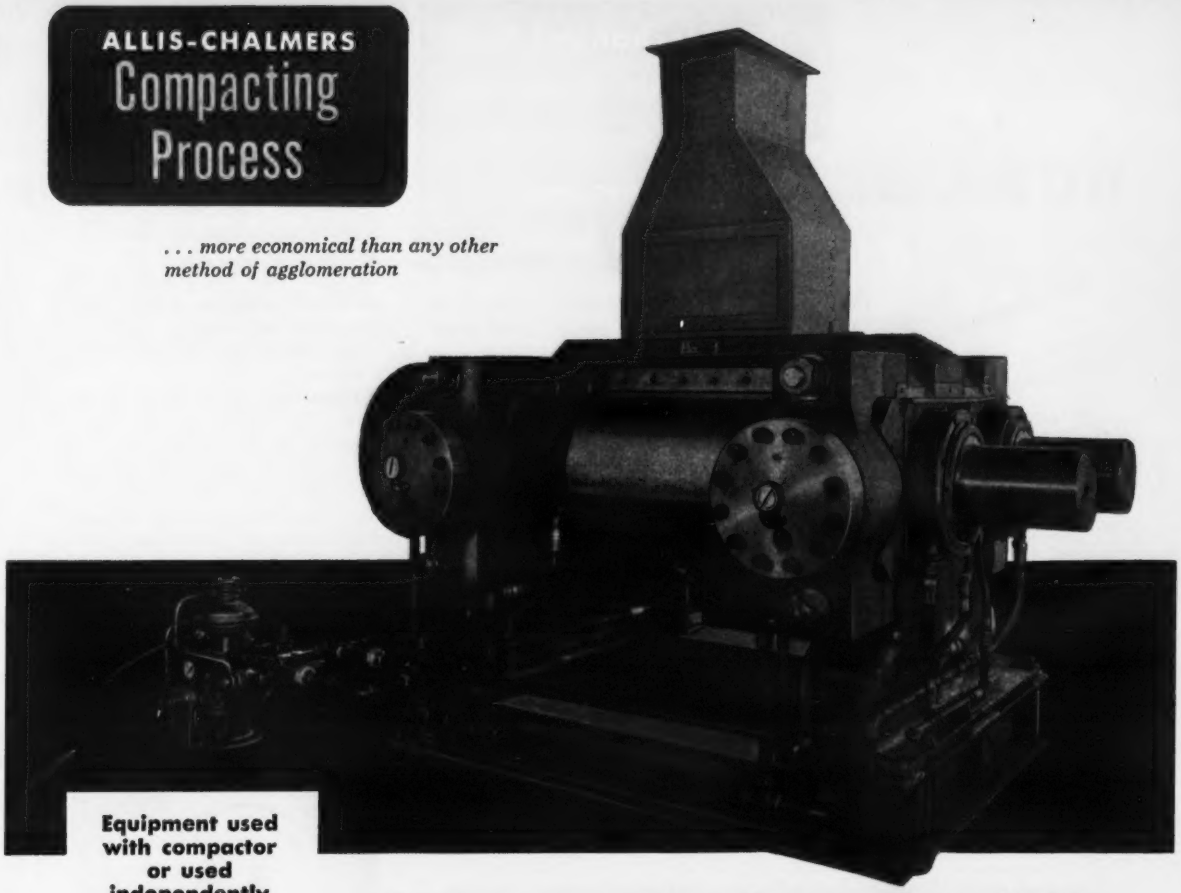
Check 3686 opposite last page.

(For more information on baked phenolic finish contact Lithcote Corp., 5000 Lake St., Melrose Park, Ill.)

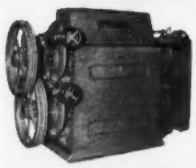
Check 3687 opposite last page.

ALLIS-CHALMERS
Compacting Process

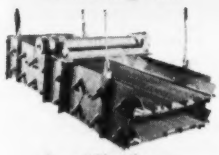
. . . more economical than any other method of agglomeration



Equipment used with compactor or used independently



Granulating Mill

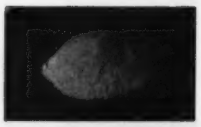


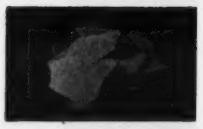
Aero-Vibe Screen

Gyratory Screen

Upgrade for Profits ...Mechanically

Precise control of *particle size, density* and *solubility factors* is now assured with the Allis-Chalmers compacting process. The heart of this efficient, completely mechanical system is this new Allis-Chalmers compacting mill.





Converts Loss into Profit

By-product material, too fine for use, from the original process, is first densified into slabs or flakes in the compacting mill. Agglomerated product is then granulated in the roller-type mill and separated in the vibrating or gyratory screen. This conversion of by-product material into a usable product changes loss into added profits.

Get Bulletin 07B8836 for the complete story. Ask your A-C representative for a copy, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

Aero-Vibe is an Allis-Chalmers trademark.

A-5582

ALLIS-CHALMERS

Check 3688 opposite last page.

The Mechanical Seal That Beats Corrosion, Temperatures, Pressures and Speeds

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KALAMAZOO, MICHIGAN

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for washing, cooling, processing, humidifying, dehydrating, and hundreds of other applications.

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O. K. Binks, send me your comprehensive Spray Nozzle Catalog without obligation.

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ADDRESS_____
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Check 3690 opposite last page.

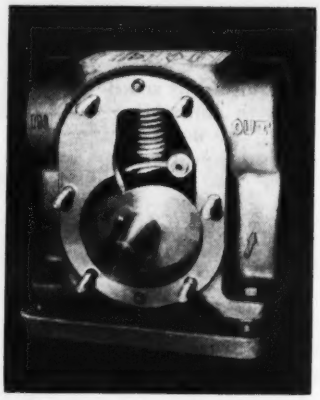
Flow rate is maintained at metering accuracy by displacement unit

Stainless steel, special alloys resist corrosion, abrasion

Uses: For moving wide range of products, from volatile gases to viscous materials like paste, pie fillings, and cherries.

Features: Unit maintains flow at metering accuracy, there is no pulsating, foaming action, agitation, or churning. Stainless steel and special alloys are used throughout for resistance to corrosion and abrasion.

Description: Rotary positive-displacement pump has only three moving parts. Two lobes, keyed at right angles to each other on single shaft, form one unit. A pair of spring tension arms form seal between suction and discharge, and also clean lobes after each revolution. Each of the lobes draws in new volume of material with every 180 degrees of shaft rotation, providing the "positive displacement."



Rotary positive-displacement pump features extremely high operating efficiency

Pump is available in four models which will be able to handle pressures up to 200 psi and capacities up to 56 gpm. Pump will pull full vacuum, and no priming is required.

("Twin-Lobe" rotary positive displacement pump is product of Manton-Gaulin Manufacturing Co., 44 Garden St., Everett 49, Massachusetts.)

Check 3691 opposite last page.

For Chemical Process Industries

LUZERNE CHECK LIST

Of Complete Corrosion-Resistant Materials, Equipment and Services

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Specializing in intricate, heavy parts; metal inserts molded in.

HARD RUBBER, CUSTOM MOLDED

New uses, new compounds of this reliable chemical-resistant material.

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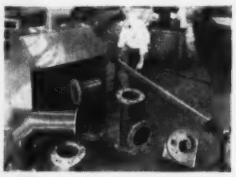
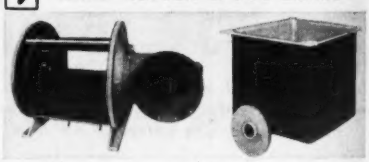


Unlimited applications and versatility for this fine plastic—rigid polyvinyl chloride.

HARD RUBBER & PVC LINING



Complicated castings, also pipe, fittings and tanks lined to specification.

HARD RUBBER PUMPS

New mechanical seal eliminates usual packing troubles.

PVC & HARD RUBBER PIPE, FITTINGS & VALVES

PVC sizes ¼" to 12", temperature to 140° F. Hard rubber sizes ¼" to 8", temperature to 225° F. in heat-resistant Buna-N.

Write for complete information or contact our sales representative nearest you.

For ready reference look us up in Chemical Engineering Catalog

The LUZERNE RUBBER CO.
200 Muirhead Avenue Trenton, N. J.

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R. C. FOLTZ CO. Houston, Texas

Check 3692 opposite last page.

PETROCHEMICALS SECTION

—starts on page 87 in this month's CHEMICAL PROCESSING and is carrying news on the booming worldwide petrochemical industry.

Designed for Management

Section has been especially designed to meet the needs of petrochemical management.

It analyzes the meaning of petrochemical developments here and abroad. Engineering-type articles telling how costs can be cut, labor saved, or products improved are included.

Information on petrochemical processes are featured.

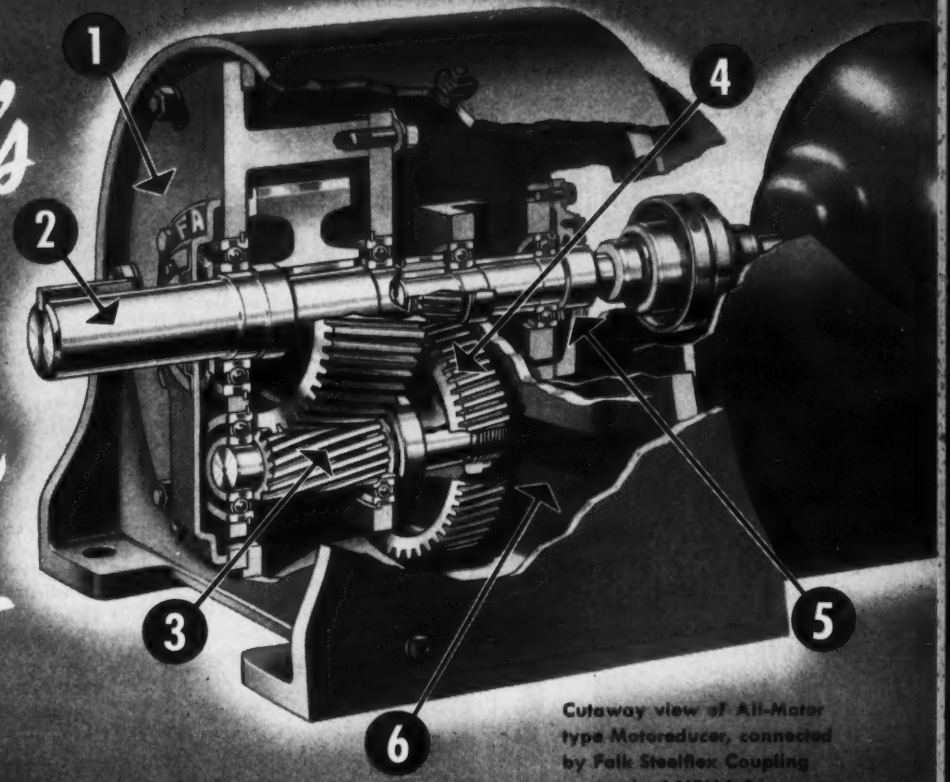
Reports study on petrochemicals

This month, the section leads off with results of a study CHEMICAL PROCESSING made in cooperation with a number of petrochemical leaders.

Report indicates petrochemical industry will top growth rate for either petroleum refining or chemical industry.

For more information on product at right, specify 3693 see information request blank opposite last page.

Here's the inside story—



Cutaway view of All-Motor type Motoreducer, connected by Falk Steelflex Coupling to standard NEMA frame motor

WHY Falk Motoreducers give better service—have longer life

Here is the "inside story" behind the all-steel All-Motor type FALK Motoreducer's universal reputation as a gear drive unmatched in quality, efficiency, dependability, ease of maintenance and long life. These "In-built" factors are—

1 **ALL-STEEL HOUSINGS.** Rugged, strong, rigid...all parts are manufactured from heavy steel plate, formed and welded in the Falk Weld Shop.

2 **LARGE OVERHUNG LOAD CAPACITY.** Large shafts, oversize bearings...rigid mountings with wide bearing spans to handle maximum applied loads.

3 **PRECISION GEARING.** Heat-treated alloy steel gearing, precision cut and shaved after heat treatment to eliminate distortion. Quiet, crown-shaved pinions.

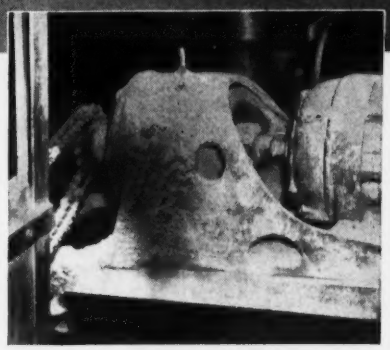
4 **EXTRA-CAPACITY GEARING.** Special extra-capacity gear-tooth form with larger contact area gives greater strength, higher load-carrying capacity.

5 **SEALED HOUSINGS.** Splashproof, dustproof, oil-tight construction. Dual closures and one-way vents keep oil in, dust and moisture out.

6 **POSITIVE LUBRICATION.** Large sump capacity...oiltight construction assures clean lubricant...revolving elements lubricated by direct dip.

When you buy or specify the All-Motor type FALK Motoreducer, you get all these—plus the tremendous advantage of full interchangeability of motors. Switch motors as desired—use any make, style or type of standard foot-mounted motor within the unit's AGMA rating—with a minimum of difficulty or "down time."

Available in sizes up to 75 hp—*with or without motor*—from convenient factory, field or distributor stocks, from coast to coast. **Write for Bulletin 3100.**



60,000 HOURS WITHOUT A FAILURE!

Sixty thousand hours is a lot of hours—but the FALK Motoreducer in the unretouched photo above has served that long without failure or need of repair.

This 3 hp unit is one of over 60 FALK Motoreducers in daily service in an Eastern plant of a large milling company, whose president says, in part:

"One of the main advantages of FALK Motoreducers is their adaptability to any motor. Reducers and motors can be easily interchanged....Our service records confirm the wisdom of our choice of FALK equipment as our standard."

FALK ...a good name in industry

THE FALK CORPORATION, MILWAUKEE, WISCONSIN

MANUFACTURERS OF

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
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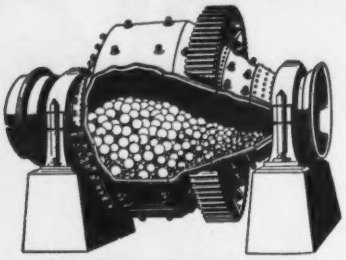
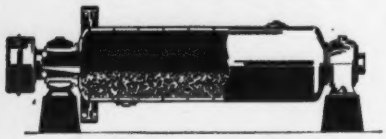
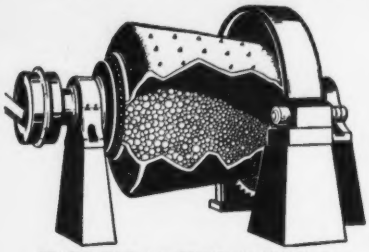
GRINDING MILLS
for every application



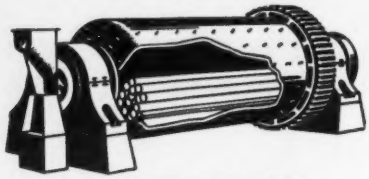
HARDINGE CONICAL MILLS



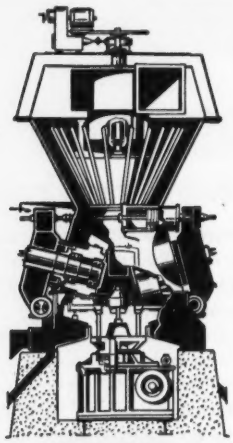
HARDINGE TUBE MILLS



HARDINGE TRICONE MILLS



HARDINGE ROD MILLS



HARDINGE
DISC ROLL MILLS

Write for Bulletin AH-474-13

HARDINGE
COMPANY INCORPORATED
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New York · Toronto · Chicago · Hibbing · Houston · Salt Lake City · San Francisco

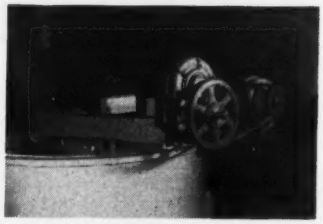
Check 3694 opposite last page.

ENGINEERING

Product quality improved, production rate tripled with speed reducers

Safety, maintenance benefited in milling operation

Problem: Producion was slow and costly, and personnel safety was impaired at Carter Paint Company, Liberty, Indiana, manufacturer of roof maintenance products and industrial maintenance enamels. In operation involving two steel ball mills for grinding pigments, two pebble or porox mills, and six mixers, line and jack shafting were used with 50-hp steam engine for power source. It was necessary to mill some products for 48 hours. This required six eight-hour-day shifts, to avoid excessive overtime charges. Carter wished to replace the line and jack shafting with individual electric-motor drives.



Milling operation production was tripled and product quality improved through application of torque-arm speed reducer

Extremely close control of both mixer and mill rpm was necessary. A minor difference in the rpm would result in quality breakdown on product. Extremely low speeds on the driven machines were required — as low as 56 rpm from a 1750-rpm motor. Operation with the old shafting installation was hazardous, because there was always danger of accidentally starting the machine while loading or unloading.

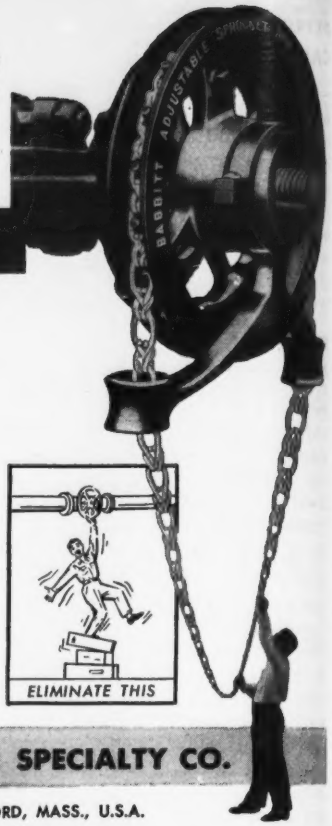
Solution: After considering all possible alternatives, Carter installed torque-arm speed reducers. Reducers were mounted directly on driven shaft and locked at both ends. No foundation, flexible coupling, or sliding base were required.

Unit is driven through V-

718-7

Safe, Floor Level OPERATION
with a
Babbitt
Adjustable
SPROCKET RIM
with Chain Guide

- Simplifies pipe layout
- Fits any size valve wheel
- Easy to install and operate
- Operates any valve from plant floor
- Time and money saving fixture
- No maintenance; first cost *only* cost
- Packed, completely assembled, one to a carton
- Hot galvanized, rust-proof chain available for all sizes
- Easy to follow instructions with each unit
- Your supplier carries complete stocks
- Write for new descriptive catalog sheet and prices



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PRATER CAN Solve YOUR AIRLOCK FEEDER PROBLEM!

More than 2000 different Prater Airlock applications have solved processing requirements for 300 concerns. You'll find there IS a Prater Airlock for your need . . . from low pressure dust control to high pressure pneumatic conveying.

STANDARD DUTY
Principally adapted for sealing off collectors against air leakage.
Four Sizes . . . 6″, 8″, 10″ and 12″.

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For applications involving high pressure Pneumatic Conveying or Volumetric feeding of finely ground materials.
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For pneumatic conveying systems handling flour or similar fine powder or granular material.
Available for 2″, 3″ or 4″ Conveying Lines.

Send for informative Booklet P-55
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Foremost Builder of Rotary Airlock Feeders

PRATER PULVERIZER COMPANY
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Check 3696 opposite last page.

belt drive. Stock Taper-Lock sheaves prescribed for each job permit speed ratios required.

Results: Production was tripled because it was possible to run mills 24 hours per day. It was now possible to mill products that formerly required six eight-hour shifts in a two day period. Machines can be run individually and work load distributed to machines needed without running entire system.

Quality of product is improved because of continuous milling operation, and because absolute speed-control on both the mills and mixer is maintained. Because each machine is controlled separately for shut-down on loading and unloading, plant safety has been greatly improved. The noise factor was substantially reduced, and overall plant maintenance improved because of cleaner operating conditions. Drive maintenance on installation is almost nonexistent.

(Torque-arm speed reducer is product of Dodge Manufacturing Corporation, 6200 Union Street, Mishawaka, Indiana.)

Check 3697 opposite last page.

Cast steel tensile strength, cast iron economy — ductile iron valve

Uses: For valve services requiring exceptional strength and resistance to fracture and thermal shock.

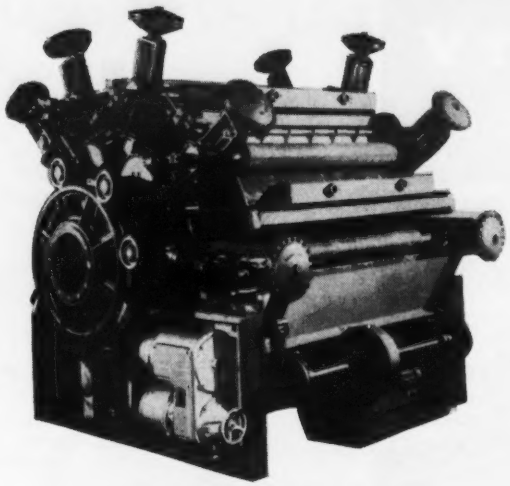
Features: Valves cast of this material have tensile strength of cast steel and approach the economy of cast iron. Inherent toughness of material provides high resistance to impact damage and thermal shock.

Description: Ductile iron diaphragm valve is available as complete unit. Replacement components of body, bonnet, and handwheel are available with screwed ends (½ to 3″) and flanged ends (½ to 8″).

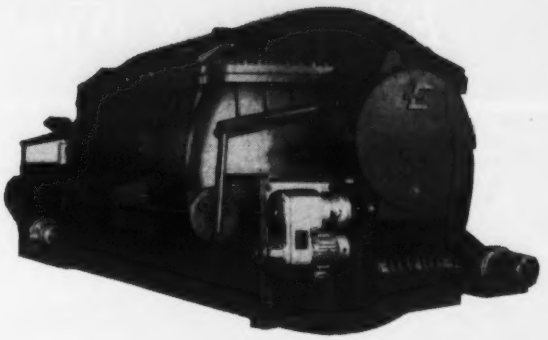
(Ductile iron diaphragm valve is product of Hills-McCanna Company, 2370 W. Nelson Street, Chicago 18, Ill.)

Check 3698 opposite last page.

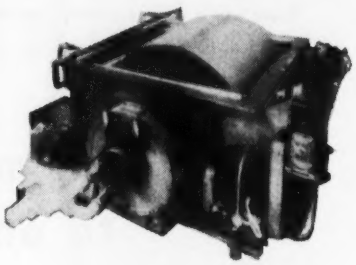
THESE EIMCO CLIENTS . . . EACH WITH A DIFFERENT FILTERING JOB PROFIT FROM EIMCO " TAILORED TO FIT " FILTERS



EIMCO CONTINUOUS BICARB WHEEL
Filters in Soda Ash Process (Uses 3, 4 and 5 press rolls)



EIMCO PRESSURE DRUM WITH REPULPER
Handles flammable material



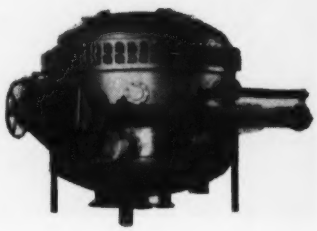
EIMCO VACUUM PRECOAT
Filters a yeast liquor

Behind the development of each of these Eimco Vacuum and Pressure Filters, lies the story of an individual chemical processor who needed a **special** filter for a **specific** job and sought Eimco's help.

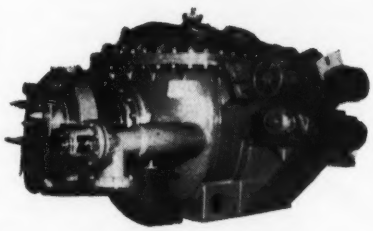
Eimco responded by giving each request **individualized** attention. We utilized "pre-analysis" information provided by competent Eimco Sales Engineers; complete, modern test facilities and data at the Eimco Research and Development Center, and know how and experience of skilled Eimco Technologists.

Eimco has discovered many new influencing factors in vacuum and pressure filtration, important to the **total** economic picture. A particular vacuum advantage may be offset by a more profitable pressure advantage, elsewhere (or vice versa). Eimco balances these advantages to assure you the most profitable equipment selection from a realistic investment-operating cost standpoint.

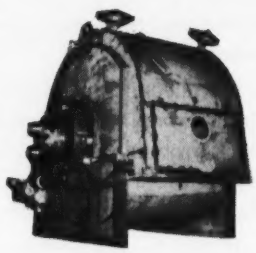
Because **custom design** calls for a high degree of specialization, it is important that you begin by talking over your problem with an Eimco Representative. Let us arrange this meeting at your convenience.



EIMCO PRESSURE DRUM
Deashes coal tar



EIMCO PRESSURE DEWATERER
Filters for a Phenol, Acetone and Alphamethyl Styrene Producer



EIMCO CONTINUOUS VACUUM DRUM
Handles an acrylic polymer slurry

THE EIMCO CORPORATION
SALT LAKE CITY, UTAH

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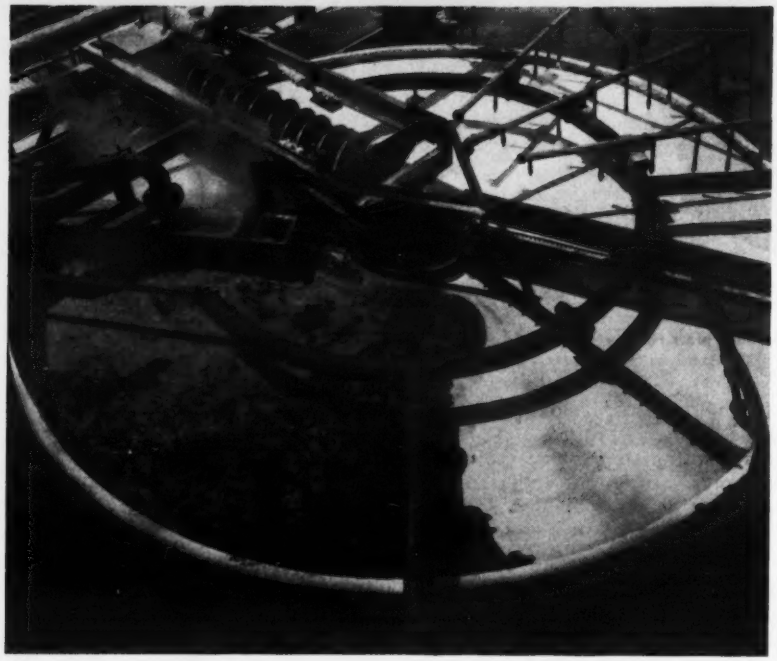
Export Offices: Eimco Building, 51-52 South Street, New York 5, N. Y.
BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

B-596

Check 3699 opposite last page.

at TRONA

Here's
HIGH CAPACITY
Filtration & Washing . . .



This un-retouched photo dramatically illustrates the fundamental advantages of the Oliver Horizontal Filter. Note the even feed distribution and maximum area utilization . . . without using a filter tank or agitator. Note, too, the fast dewatering of feed and the two stages of counter-current washing in a single pass on the table.

Installed at American Potash and Chemical Corporation's giant Trona, California plant, this Oliver operates around the clock producing agricultural grade potash. One of five Horizontals of the over forty Oliver Filters of various types at Trona, the unit has a wash efficiency of about 90%.

If you have a problem involving high tonnage filtration and washing of any fast settling, free filtering product, the Oliver Horizontal should be at the top of the list for consideration. Write for a copy of Bulletin No. 7201 for more information.

Dorr-Oliver Incorporated, Stamford, Conn.

DORR-OLIVER
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WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

Check 3700 opposite last page.

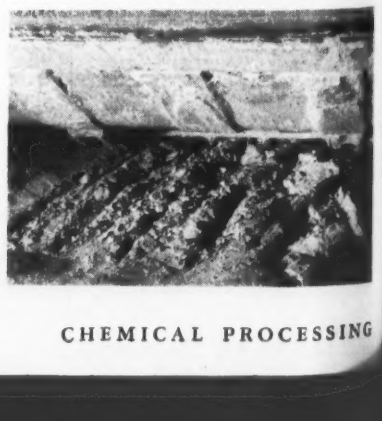
As tractor shovel works superphosphate pile at Virginia-Carolina Chemical Corp., scarifier attachment (arrow) prevents build-up of material on concrete floor

Pick-and-shoveling hard packed fertilizer from concrete floors was a time-consuming job at Virginia-Carolina Chemical Corp. Use of tractor shovel with scarifier attachment . . .

Cuts 80 man-hour job to one hour

Problem: Build-up of superphosphate fertilizer on concrete runways and floors at Virginia-Carolina Chemical Corp., Portsmouth, Va., had to be removed periodically to maintain safe footing conditions and recover valuable product. During bulk handling, heavy moving equipment would continuously pack fertilizer into a hard layer ranging from six to eight inches deep. Company either had to assign a crew with picks and shovels to laborious job of digging up hard-packed superphosphate or rent a road grader to do the job.

Solution: During latter part of November 1956, Virginia-Carolina put a tractor shovel with a scarifier attachment to work on superphosphate handling operation. Attachment consists of four teeth, hinged



Close-up of scarifier in action. Equipment cleans as much floor in an hour as a ten-man crew could in an eight-hour day

on a bracket behind bucket. Teeth dig only when bucket is lowered and machine travels in reverse. They do not interfere with normal bucket operation and are quickly removable if necessary. As pile of fertilizer is worked, scarifier cuts into floor build-up.

Results: When equipment first went into operation, build-up on floor was six to eight inches deep. Scarifier cut from three to four inches into hard-packed layer with each pass. Clean-up of this freed material required very little additional time. Once original superphosphate was removed, it was necessary only to permit scarifier to drag the floor as tractor backed off pile with a load to prevent any further build-up.

Management at Virginia-Carolina estimates that tractor shovel with scarifier attachment cleans as much concrete floor in one hour as ten to twelve men with picks and shovels could in an eight-hour day.

(HAH Payloader with scarifier attachment was supplied by The Frank G. Hough Co., Libertyville, Ill.)

Check 3701 opposite last page.

Motor drive operation and control features with valve operator

Considerable savings in space

Uses: For power operation of valves on large sizes where pressures handled make manual operation difficult, or where remote or automatic control is a desirable factor in piping system.

Features: Unit was developed to provide same features of operation and control obtainable from motor drive, with considerable savings in space.

Description: Electro-hydraulic valve operator consists of power unit, hydraulic cylinder, and necessary mounting and power transmission rigging. Power unit consists of small, high-speed electric motor, hydraulic reversible-type

POWELL

world's largest family of valves

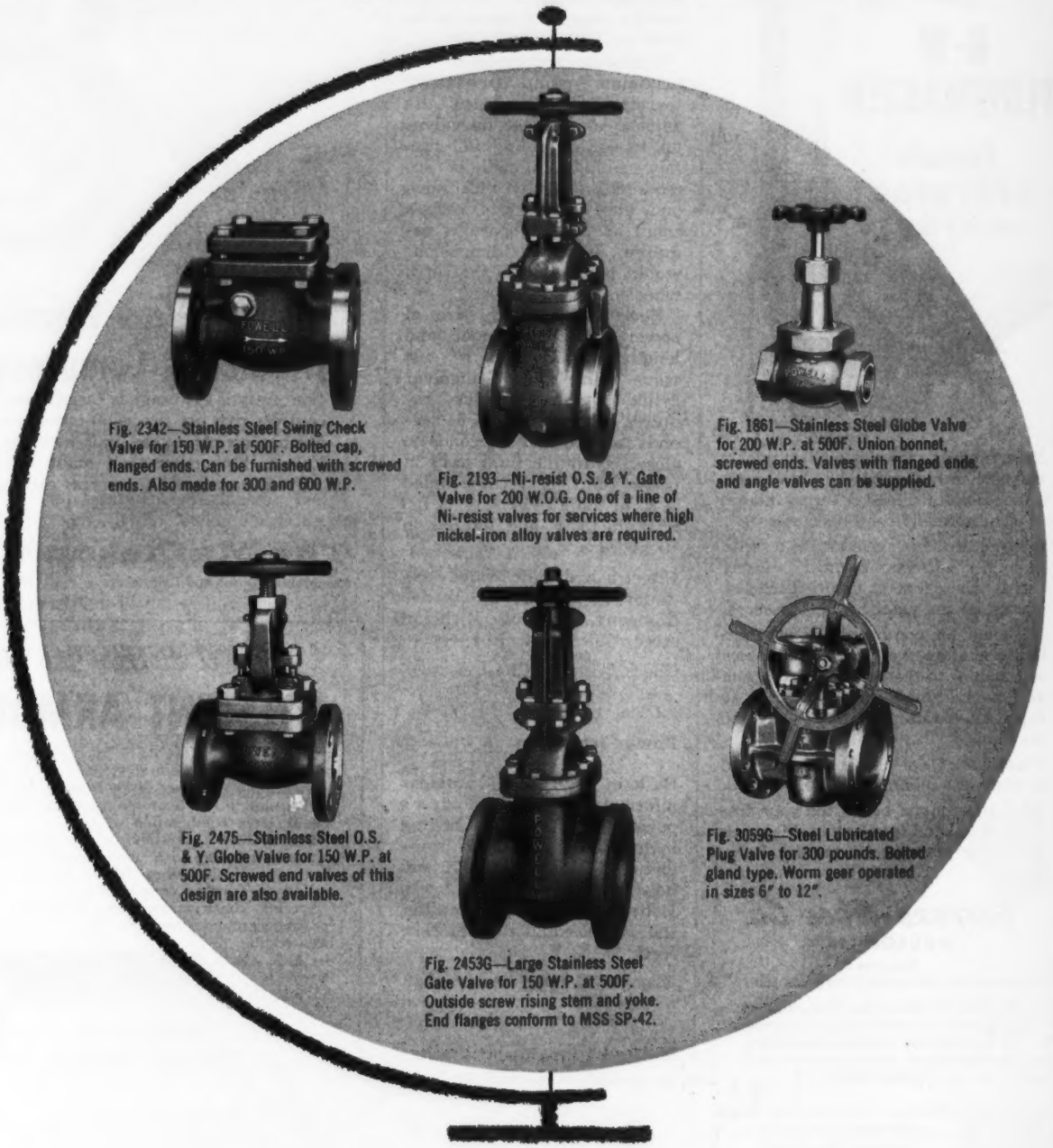


Fig. 2342—Stainless Steel Swing Check Valve for 150 W.P. at 500F. Bolted cap, flanged ends. Can be furnished with screwed ends. Also made for 300 and 600 W.P.

Fig. 2193—Ni-resist O.S. & Y. Gate Valve for 200 W.O.G. One of a line of Ni-resist valves for services where high nickel-iron alloy valves are required.

Fig. 1861—Stainless Steel Globe Valve for 200 W.P. at 500F. Union bonnet, screwed ends. Valves with flanged ends and angle valves can be supplied.

Fig. 2475—Stainless Steel O.S. & Y. Globe Valve for 150 W.P. at 500F. Screwed end valves of this design are also available.

Fig. 2453G—Large Stainless Steel Gate Valve for 150 W.P. at 500F. Outside screw rising stem and yoke. End flanges conform to MSS SP-42.

Fig. 3059G—Steel Lubricated Plug Valve for 300 pounds. Bolted gland type. Worm gear operated in sizes 6" to 12".

FOR EVERY FLOW CONTROL PROBLEM Powell offers more kinds or types of valves, available in the largest variety of metals and alloys, to handle every flow control requirement. Your local valve distributor will be glad to tell you all about them. Or write to us for the full facts.

THE WM. POWELL COMPANY • *Dependable Valves Since 1846* • **Cincinnati 22, Ohio**

Check 3702 opposite last page.

G-W FLOWMASTER

feeds elevates conveys

Free running material moves quickly and efficiently through the Flowmaster on horizontal, inclined, or vertical planes in a substantially continuous stream.

A rugged endless chain moves a series of solid steel flights through a closely fitted casing that is totally enclosed, dust-proof and gas-tight (if necessary).

Designed for continuous or intermittent operation, the Flowmaster is also self-loading to the proper capacity and self-discharging — which allows it to replace separate units for feeding and elevating.

Flowmasters are highly versatile and operate in a minimum space.

Mail the coupon below for your free copy of G-W's Idea Book on Materials Handling plus details on the Flowmaster.

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Please send me complete information on the *Flowmaster*, plus G-W's big "Idea Book" on materials handling.

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Check 3703 opposite last page.

gear pump with necessary control valves included in housing, fluid reservoir and pressure switches, all assembled into compact unit. Hydraulic pressures range up to 3200 psi.

Cylinders are designed for maximum pump pressure, therefore, bores of 1½"-diameter can be used on valves up to and including 10"-size. Power unit and cylinder are mounted integrally with valve and, due to their size, only a small amount of space is required. Overall dimensions would be similar to that of a wheel-operated valve.

Speed varies with size of power unit and cylinder, and length of stroke. A 6" test valve using a 1½"-diameter cylinder with 6"-stroke, requires approximately 8 seconds to open and 8 seconds to close. Hydraulic fluid used in power unit is recommended —20 to 150°F. Viscosity is 150 SSU at 100°F and filtered to 10 microns.

(Electro-hydraulic valve operator is product of Okadee Company, 332 South Michigan Ave., Chicago 4, Ill.)

Check 3704 opposite last page.

Power transmission belting

Bulletin of 12 pages provides information on manufacturer's power transmission belting including how to obtain proper belt, maintenance data, and how to reduce bearing loads. Belting bul — Extremultus, Inc., 405 Lexington Ave., New York 17, N. Y.

Check 3705 opposite last page.

Limited space applications no problem for valve

Satisfies high-pressure, accurate control needs

Uses: As a gage, or for metering service in gas, oil, water lines, or similar uses.

Features: Unit developed for applications where space is a factor and where operating areas are close. It is reported to give exceptional use where high-pressure, accurately con-

Simplify Gas Handling with Matheson Compressed Gas Controls

Compressed gas usage is easier, safer and more efficient when you use controls that are precision-tested and tailored for individual gas use. Matheson's complete line includes Automatic Regulators, Needle Valves, Flowmeters and many other special valves and regulators. All are described in our Gas catalog. Write for your copy.

The Matheson Company, Inc.
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Check 3706 opposite last page.

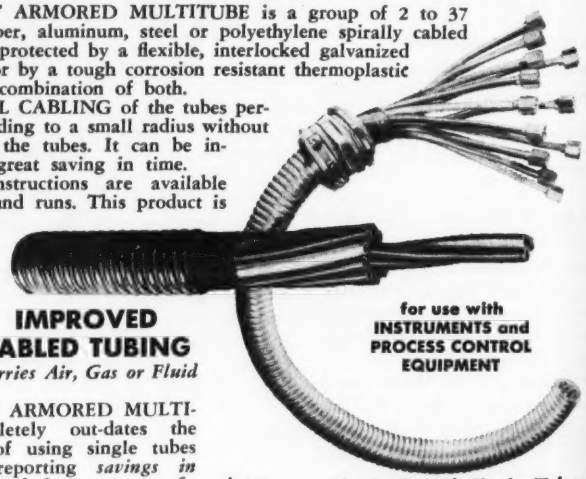
Get A Better Job At Less Cost With

CRESCENT ARMORED MULTITUBE®

CRESCENT ARMORED MULTITUBE is a group of 2 to 37 tubes of copper, aluminum, steel or polyethylene spirally cabled together and protected by a flexible, interlocked galvanized steel armor, or by a tough corrosion resistant thermoplastic sheath, or a combination of both.

The SPIRAL CABLING of the tubes permits easy bending to a small radius without distortion of the tubes. It can be installed with great saving in time.

Special constructions are available for underground runs. This product is licensed under U.S. Patent 2,578,280.



IMPROVED CABLED TUBING
Carries Air, Gas or Fluid

for use with INSTRUMENTS and PROCESS CONTROL EQUIPMENT

CRESCENT ARMORED MULTITUBE completely out-dates the old method of using single tubes with users reporting *savings in installed cost* of from two to five times the cost of the multitube. In addition, the MULTITUBE system will result in fewer connections and fittings, lower costs for supports or racks, ease of mounting and less space.

Plastic Coated Single Tubes, copper or aluminum, should be used to give corrosion protection to all single lines up to the final tube fitting, where trouble from corrosion may occur.

SEND FOR BULLETIN 356-E GIVING COMPLETE INFORMATION AND ENGINEERING DATA

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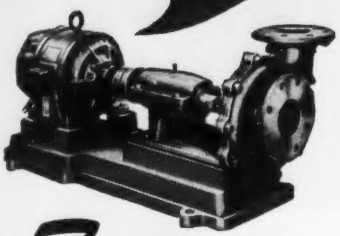
Check 3707 opposite last page.

Custom-built for EFFICIENT DEPENDABLE SERVICE



Frederick

SSV PUMPS

Enclosed Impeller and Open Impeller Types

You're sure of maximum service and output with minimum maintenance or production down time with Frederick SSV Centrifugal Pumps because each pump is custom-made to fit your particular operation—whatever the consistency or type of liquid you're moving.

SSV PUMP FEATURES

- **Pump sizes from 1" to 4" discharge openings.**
- **Pump capacities from 50 up to 700 U.S. GPM.**
- **Heads from 30 up to 220 feet.**
- **Pumps speeds can be varied to suit the driving media and operating conditions.**

CONSTRUCTION ADVANTAGES

Pump casings are vertically split for easy accessibility. Mounted on a swivel to permit placing discharge in any desirable position. Pump openings, both suction and discharge, flanged to permit easier connection and disconnecting to joints. One-piece impellers, securely attached to shaft by stout key and lock nut, or threaded, give long service. Pump bearings mounted in sturdy frame horizontally split for easier accessibility. Extra long stuffing box provides for oversize stuffing. Mechanical seal also available for minimum leakage. Pump coupling flexible for direct connection to drivers or can be arranged for belt drive. Pump speed, pump openings, etc. are selected to suit your particular requirements.

Write for Bulletin No. 107

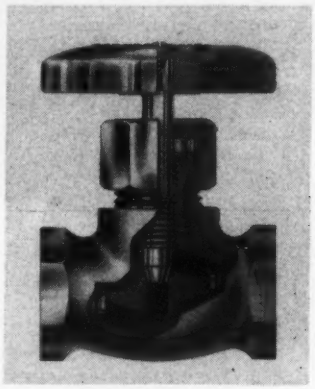
FREDERICK PUMPS

FREDERICK IRON AND STEEL, INC.
FREDERICK Est 1890 MARYLAND

Check 3708 opposite last page.

trolled and perfect shut-off needle-valve is required.

Description: Globe-type needle-valve features one-piece solid-forged carbon-steel body with 12/14 chromi-

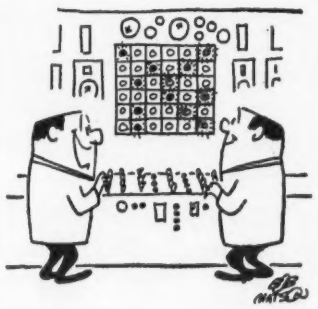


Space limitations pose no problem for this compact valve

um heat-treated stainless steel stem with Teflon packing. Short, compact, and precision machined, valve is available in ⅛, ¼, ⅜, and ½" sizes. Maximum working pressure is 10,000 lb psi at 70°F. Maximum operating temperature is 500°F.

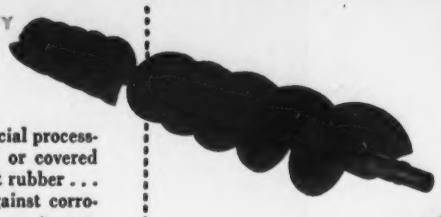
(Type N-28 valve is product of Kerotest Manufacturing Company, 2525 Liberty Ave., Pittsburgh 22, Pa.)

Check 3709 opposite last page.



"OK, it's your move."

NO SHAPE TOO SCREWY
for ACE Rubber Linings and Coverings



Most any size or shape of special processing equipment can be lined or covered with quality ACE hard or soft rubber . . . for meticulous protection against corrosion, to resist abrasive wear, or to provide electrical insulation. Ask for recommendations.

STOP VALVE CORROSION
at lower cost

There's an ACE hard rubber, rubber-lined, or plastic-lined valve for every corrosion application. Sizes from 2" to 24". Diaphragm, gate and check types. Free *Bulletin CE-52* lists chemicals that can be handled.

Take the guesswork out of CORROSION

No need for "trial and error" to find the right rubber or plastic chemical equipment. Consult American Hard Rubber Company first. Now eleven basic materials. Wide range of temperatures, pressures, strength. Backed by a century of experience. Write for facts today, or ask for name of Distributor.

FOR HIGH PRESSURES OR BIG PIPE LINES

ACE Rubber-Lined Steel . . . strength and pressures of steel plus chemical resistance of hard rubber. Excellent for alkalis, most inorganic acids, many organic acids, all salts, bleaches. Sizes 1¼" to 24" and up. *Bulletin CE-52.*

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Practically indestructible

Its made of a new rubber-plastic material that's tough, resilient, suitable for handling most acids and alkalis. 3-gal. size. Easy-pour, drip-proof spout. Also 1-qt. and 2-qt. dippers, hard rubber bottles, etc. Write for name of nearest dealer.

ACE processing equipment of rubber and plastics

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DIVISION OF AMERACE CORPORATION
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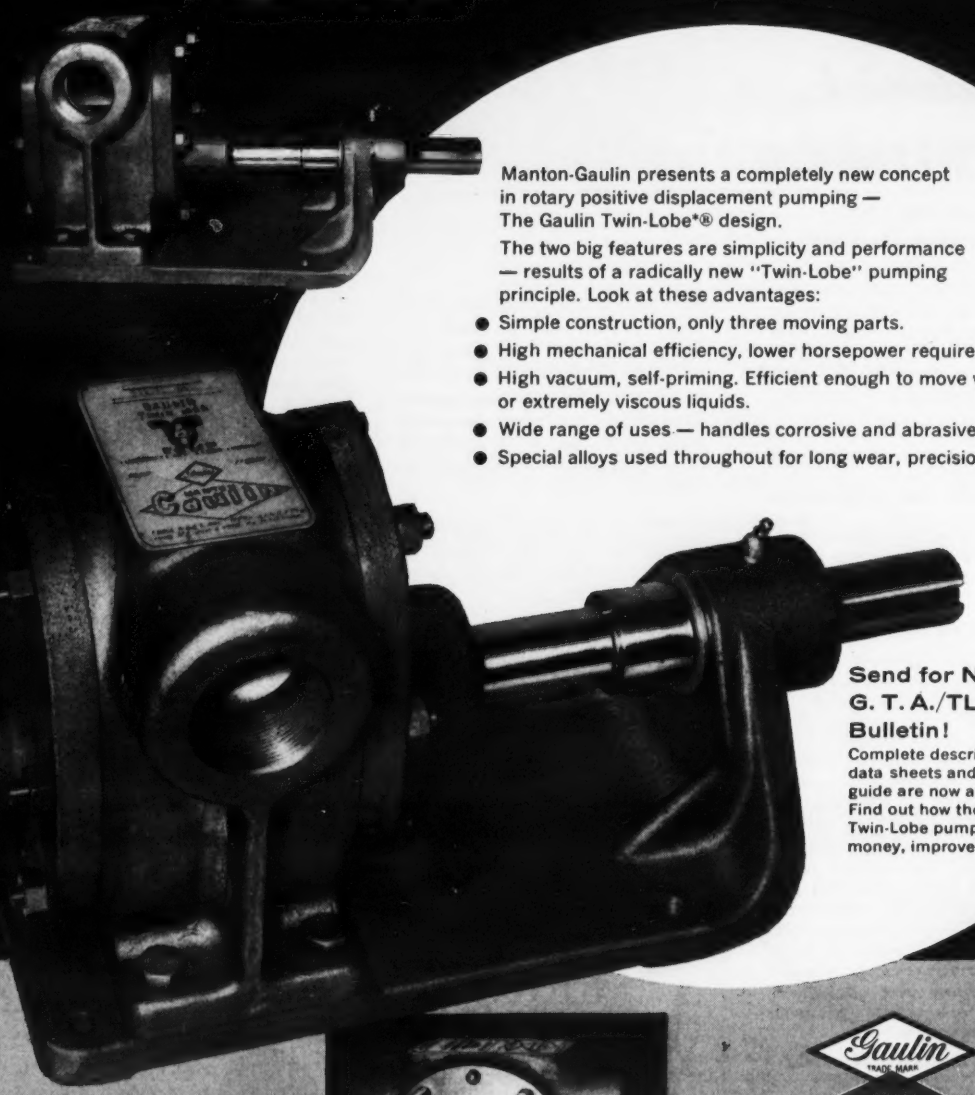
Check 3710 opposite last page.

NEW TWIN-LOBE® Positive Displacement PUMP*



Manton-Gaulin presents a completely new concept in rotary positive displacement pumping — The Gaulin Twin-Lobe*® design.

The two big features are simplicity and performance — results of a radically new "Twin-Lobe" pumping principle. Look at these advantages:

- Simple construction, only three moving parts.
- High mechanical efficiency, lower horsepower required.
- High vacuum, self-priming. Efficient enough to move volatile gases or extremely viscous liquids.
- Wide range of uses — handles corrosive and abrasive materials.
- Special alloys used throughout for long wear, precision fit.

Send for New G. T. A./TLP-57 Bulletin!

Complete description, data sheets and application guide are now available. Find out how the new Twin-Lobe pump can save money, improve quality.

One Basic Design good for many uses

Liquids, heavy slurries, pastes, soft food solids, emulsions, gases, and light non-lubricating liquids

*Pat. Pending

Capacity and size range

Three models now available. Capacities: 0-56 gpm; Pressures: 0-200 psi.

Gaulin® TRADE MARK

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55 GARDEN ST. EVERETT 49, MASS.

World's largest manufacturers of stainless steel reciprocating, rotary, pressure exchange pumps, dispersers, homogenizers and colloid mills.

For more information on product at right, specify 3711 see information request blank opposite last page.

Ask GTA . . .

Gaulin Technical Assistance — for data on the complete Gaulin line: Homogenizers, Colloid Mills, Twin-Lobe Pumps, Triplex High Pressure Pumps and HX Pumps. Get GTA from your nearest Manton-Gaulin Representative . . .

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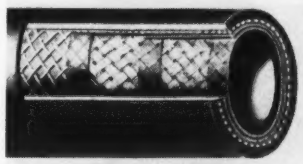
Gaulin
Gaulin
55 Garden St. Everett 49, Mass.

Wire-braided steam hose for 385°F temperatures guards against rupture

Uses: For saturated steam pressures up to 200 psi or for handling super-heated steam.

Features: Two braided plies of high-tensile reinforcing wire, guard against hose rupture or bursting during operations at temperatures up to 385°F.

Description: Wire-braided steam hose is constructed of high-quality, heat-resisting rubber tube and braided plies of high-tensile reinforcing wire. It is available in sizes from ½ to 2½" ID. These sizes weigh from 62 to 230 lb per 100 ft. Heat-, oil-, and abrasion-resisting neoprene cover is bonded to wire carcass by ply of high-tensile, heat-resisting cord yarn.



Reinforcing wires guard against rupture of steam hose during operations up to 385°F

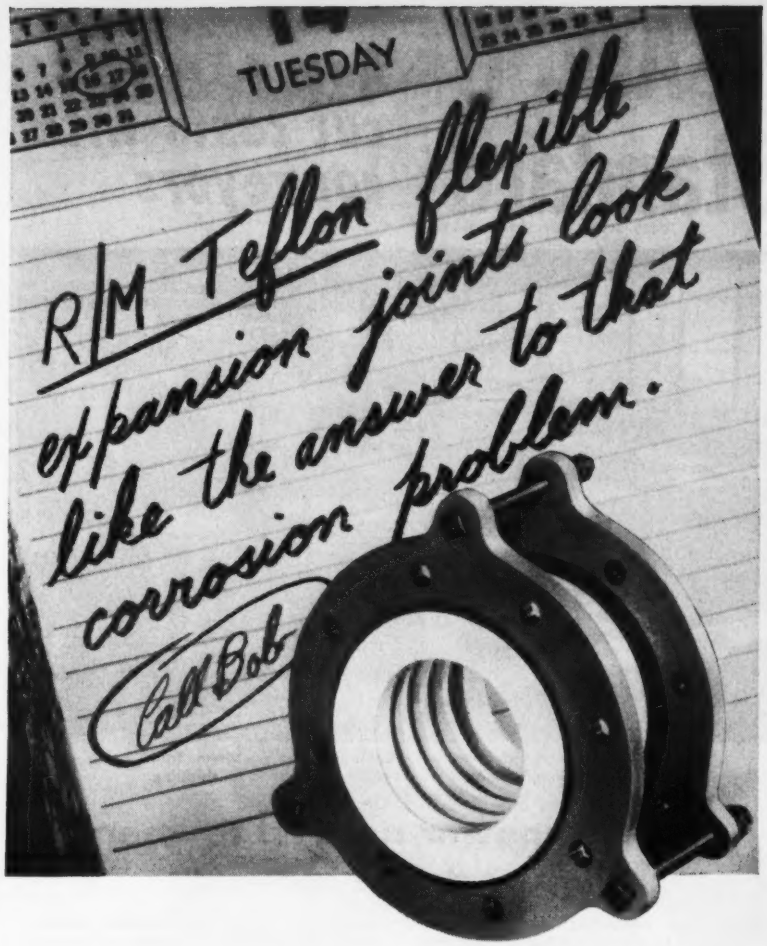
(Gibraltar steam hose is available from Hamilton Rubber Mfg. Corp., Div. of Acme-Hamilton Mfg. Corp., 115 Meade St., Trenton 3, N. J.)

Check 3712 opposite last page.

All steamed up

Designed and built to provide low-cost dry steam for industrial and other applications, packaged boiler is detailed in six-page bulletin. Features and specifications of unit which is rated from 15 to 60 hp and 150 psi, and which burns oil or gas with equal efficiency, are covered. Bul AD-166 — Cleaver-Brooks Company, Milwaukee 12, Wis.

Check 3713 opposite last page.



Chemical-handling accessories, made of "Teflon"* by Raybestos-Manhattan, are the answer to many of your more difficult problems. "Teflon" shows no reaction to chemicals — except for fluorine gas and chlorine trifluoride, both at high temperatures, and molten alkali metals. Impervious to all known industrial acids and caustics. Can be kept in continuous service at temperatures from –450°F to +500°F, depending on the physical requirements of the accessory itself.

Another valuable plus for you: R/M's strict quality control and precision workmanship. You can depend on R/M "Teflon" products: solid and envelope gaskets, sheets, rods, tube, tape, expansion joints, flexible couplings, stuffing box and valve stem packings, Vee-Flex packings, solid and braided packings.

R/M's engineers have amassed a wealth of experience in manufacturing packings and gasket materials to meet the most exacting requirements of the chemical industry. This experience is at your disposal—call on R/M!

R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS—including Vee-Flex, Vee-Square,® Universal Plastic and "versi-pak"®; GASKET MATERIALS; "TEFLON" PRODUCTS. SEE YOUR R/M DISTRIBUTOR.
*A Du Pont trademark

R/M PACKINGS
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, PASSAIC, N.J.
MECHANICAL PACKINGS AND GASKET MATERIALS

RAYBESTOS-MANHATTAN, INC., Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics
Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings
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Check 3714 opposite last page.

Ask Standard ⋮ how to cut costs with conveyors

Live roller and gravity roller system handles 55 gal. drums from storage through filling and weighing operations to shipping.

No manpower needed to keep heavy drums moving

STANDARD conveyor systems keep heavy, bulky commodities moving with minimum manpower and time loss. Systems can be job-tailored to any specific materials handling problem — to meet almost any needs.

With more than 50 years of experience in conveyor application, Standard engineers are qualified and ready to help solve your handling problems. Standard builds permanent or portable systems and units, using roller, belt, slat, chain, push-bar or sectional conveyors — power or gravity; also spiral chutes and pneumatic tube systems. Consult STANDARD CONVEYOR COMPANY General Offices: North St. Paul 9, Minnesota. Sales and Service in principal cities.

Cut costs, too, in shipping and receiving operations with Standard portable units, either powered or gravity operated. (Left) HANDIBELT portable powered conveyor unit (right) LITEWATE Sectional Roller Conveyor.

Call the Standard engineer listed in your classified phone book, or write direct for Bulletin 309 address Dept P-2

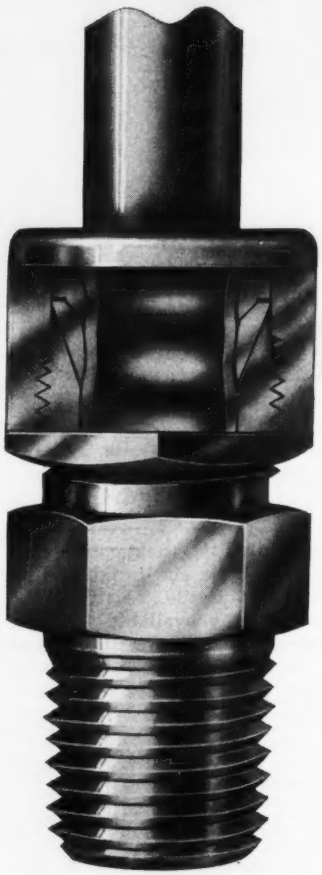
Standard 50 years of conveyor experience

GRAVITY & POWER CONVEYORS

Sales and Service in Principal Cities.

Check 3715 opposite last page.

torque-free leakproof seal



- ★
- easily installed
- ★
- engineered to meet the most exacting specifications
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- available in any machinable metal or plastic
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TUBE FITTINGS

For information on the extensive line of Swagelok Tube Fittings that provide a true torque-free leakproof seal and the name of your Swagelok Specialist, write Dept. C I.

CRAWFORD FITTING COMPANY

884 East 140th Street • Cleveland 10, Ohio

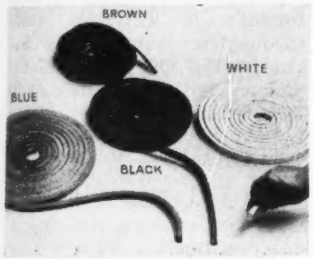
Check 3716 opposite last page.

Color-coded packing covers full pH scale for chemical use

Positive identification prevents mix-ups

Uses: As mechanical packing for chemical processing equipment.

Features: Packing is color coded for positive identification in chemical use. Color coding covers full pH scale.



Four color-coded packings simplify inventory and provide positive identification

Description: Color-coded mechanical packing is manufactured of asbestos with a coating of Teflon where necessary. A blue packing of asbestos fiber coated with Teflon is designed for strong acids, pH 1 to 4. For sealing mild acids and mild alkalis (pH 5 to 7), a black graphited grade asbestos packing is used. For sealing strong caustics and other alkalis (pH 8 to 14), a white packing can be used. This is of asbestos fiber with a multi-coat of Teflon.

A fourth packing, color-coded brown, can be used over entire pH scale from 1 to 14. It is woven of 100% filament Teflon yarn.

(Color-coded chemical packing is product of A. W. Chesterton Company, Six Ashland Street, Everett, Mass.)

Check 3717 opposite last page.

Quick-acting valve

Features of quick-acting shut-off valve for air, water, gas, or oil service are described in four-page bulletin. Bul 39-8—Homestead Valve Mfg. Co., Coraopolis, Pa.

Check 3718 opposite last page.

Did You Ever Hear of 400-S-2?

400-S-2 is a form which details all metering variables. It gives us the information needed to recommend suitable meters for any liquid used in or around your plant. Write or mail the handy coupon.

If it's a liquid . . . that can be poured or piped

ROCKWELL CAN METER IT!

(Corrosive liquids, too!)

We can't tell you how to make your product, but we can meter it! For that matter we can meter most any liquid used in making or processing your product . . . and to your advantage. With Rockwell industrial meters you can batch, blend and control formulas with precision. You can guard costly inventories, control costs. And with Rockwell automatic quantity control valves you can save time and money on repetitive operations. Find out now about the size and type Rockwell meter that will fit your service needs to a tee. Write or use the handy coupon.

INDUSTRIAL METERS
another fine product by
ROCKWELL

CLIP COUPON—MAIL TODAY

ROCKWELL MANUFACTURING CO.
Pittsburgh 8, Pa.

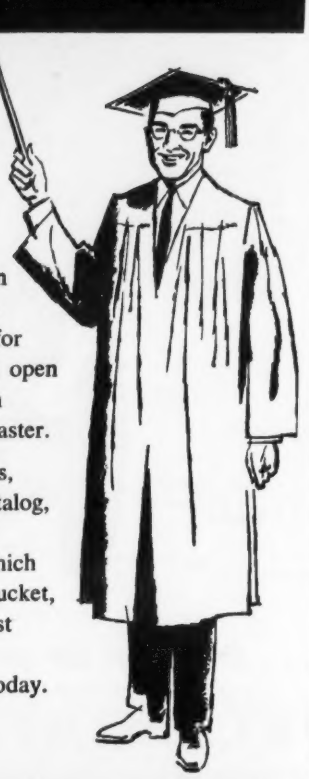
Gentlemen
I am interested in measuring _____
(Name of Liquid)
Pipe Size _____"
Working Pressure _____psi Temperature _____°F max.
Max. Flow Rate _____gpm Min. Flow Rate _____gpm
Your Name _____
Company _____
Street _____
City _____ Zone _____ State _____

Check 3719 opposite last page.

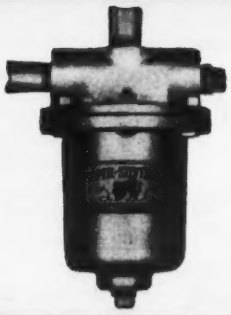
Which design of trap is best?

You can increase the heat from steam units as much as 35% by careful selection of the right design of trap. For example, although inverted bucket traps are best for most normal indoor uses, a combination open float and thermostatic trap permits steam units to reach maximum heat 2½ times faster.

For other sound design recommendations, send for Anderson's new engineering catalog, "How to Select SteamTraps and Fluid Specialties." This valuable booklet tells which of the four basic types of traps—inverted bucket, thermostatic, combination or float—is best for any installation. Send for your complimentary copy. Mail the coupon today.



ANDERSON SUPER-SILVERTOP STEAM TRAPS



THE V. D. ANDERSON COMPANY
division of International Basic Economy Corporation
1948 West 96th Street • Cleveland 2, Ohio

Please send a copy of your new engineering booklet, "How to Select Steam Traps and Fluid Specialties."

Name _____ *Title* _____

Company _____

Address _____

City _____ *Zone* ____ *State* _____

A TRAP FOR EVERY PURPOSE

Check 3720 opposite last page.

new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc., are found throughout other sections of this magazine

Aluminum, lead creep data

In report of 61 pages, creep data for seven cast and three wrought aluminum alloys are analyzed in terms of four-element mechanical model and absolute rate theory. Creep of lead data from three different published sources are analyzed through the absolute rate theory based on a four-element mechanical model in 83-page report. To obtain PB 131139, (study of creep in aluminum) and PB 121127 (study of creep in lead) remit $1.75 and $2.25, respectively, direct to the Office of Technical Services, United States Department of Commerce, Washington 25, D.C.

Bulk handling answer

Detailed information on how pneumatic conveying has solved many bulk handling problems is presented in manufacturer's 32-page bulletin. Over 70 illustrations show how air transports granular or powdered bulk material efficiently. Bul 530 — Dracco Corporation, PO Box 1794, Cleveland 5, Ohio.

Check 3721 opposite last page.

Meters for propane, butane

Bulletin of eight pages combines descriptions of manufacturer's liquid meters for measuring liquid propane, butane, and propane-butane mixtures. In addition, two-page drawing-illustrated explanation of over-all "Rockwell dispensing system," designed to insure that product remains in liquid state throughout metering, is included. Bul OG-412 — Meter and Valve Div., Rockwell Mfg. Company, 400 North Lexington Ave., Pittsburgh 8, Pennsylvania.

Check 3722 opposite last page.

Emulsifier and detergent

Various emulsifying and detergent applications of versatile oil-soluble alkyl aryl sulfonate (Emcol P10-S9) are contained in technical bulletin. Discussed are dry cleaning, for emulsion degreasers, and for solubilization of water in kerosene. Bul 50 — Emulsol Chemical Corp., 75 E. Wacker, Dr., Chicago 1, Ill.

Check 3723 opposite last page.

Flow measurement, control

Construction, installation, and maintenance of manfacturer's rotameters for flow measurement and control are contained in 12-page bulletin. Dimensions and capacity charts are included. Bul 115 — Brooks Rotameter Company, Lansdale, Pa.

Check 3724 opposite last page.

Vacuum filter

Bulletin gives complete information on manufacturer's vacuum filter, including operating advantages and economies. Bird-Young Filter Bul — Bird Machine Company, South Walpole, Mass.

Check 3330 opposite last page.

Heat exchanger uses

General uses and installation sketches of manufacturer's shell-and-tube heat exchanger and condenser equipment are illustrated and discussed in 28-page bulletin. Design and construction features are described. Listings of physical properties for miscellaneous compounds under organic liquids, water solutions, and gases are included. Bul 949 — The Pfaudler Co., 1046 West Ave., Rochester, New York.

Check 3725 opposite last page.

PVC fan data

Operation, specifications, and performance of PVC centrifugal fans, designed for blower installations requiring high chemical-resistance and wide temperature range, are presented in four-page bulletin PVC 101 — Chicago Blower Corporation, 9863 Pacific Avenue, Franklin Park, Ill.

Check 3726 opposite last page.

WANT MORE INFORMATION . . .

. . . about things you read about in the New Literature Section?

Here's How To Get It

Note the number in last line of each new literature review. Check this key number on Reader Service Slip opposite last page of this issue. Fill in the Slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

We'll contact the manufacturer for you, telling him you'd like a copy of the bulletin. He'll send it direct to you.

Chemically inert fittings, too

Made with standard 125# and 150# ASA housings (short radius), these 45° and 90° elbows can be installed in all standard flange piping systems.

Fluoroflex-T lining extends over the full gasket face of flange thus providing chemically inert, one-piece continuous barrier against all corrosive fluids.

Fluoroflex-T type S pipe and fittings are available in 1″, 1½″, 2″, 3″, 4″ and 6″ sizes.

FLUOROFLEX-T IS TEFLON AT ITS BEST

It's a known fact that properties of Teflon can be changed manyfold by deliberate or accidental minor variations of processing methods. The fabricator's *experience*, therefore, is the user's best assurance of quality and performance.

universally corrosion-PROOF piping . . . with strength of steel

Fluoroflex-T completely covers full gasket face of flange . . . making integral gasket and liner absolutely immune to:

- All acids including hydrofluoric, hydrochloric, sulphuric, aqua regia
- all caustics
- all chlorides inorganic and organic
- all sulphates
- all solvents
- all phenols
- all bleaching solutions
- all peroxides

all hot . . . and at all concentrations

Here is a chemically inert piping system that now means substantial savings for plants where severe corrosion is a costly downtime problem . . . and thermal shock an ever-present hazard.

NO CORROSION — EVEN AT HIGH TEMPERATURE AND PRESSURE

Lined with a patented high density compound of Teflon®, Fluoroflex®-T type S Pipe can handle virtually every known corrosive substance to 500°F. It will not contaminate the fluids handled.

The Fluoroflex-T liner is formed *over the full gasket face of the flange*, eliminating troublesome joints with built-in protection and sealing that requires no extra gasket. It is housed within schedule 40 seamless steel pipe with 150# ASA flanges. 300# ASA flanges also available.

ACTUAL SERVICE REPORTS: Replacing glass lined steel pipe for handling 20% hydrochloric acid at 248°F and 20 psi, pipe lined with Teflon resin was still in use 34 months later.

Lined pipe replaced silver lined pipe for handling acidic stream of boron trifluoride hydrochloric acid and organic acid at 347°F, 18 psi . . . was unchanged after 5 months.

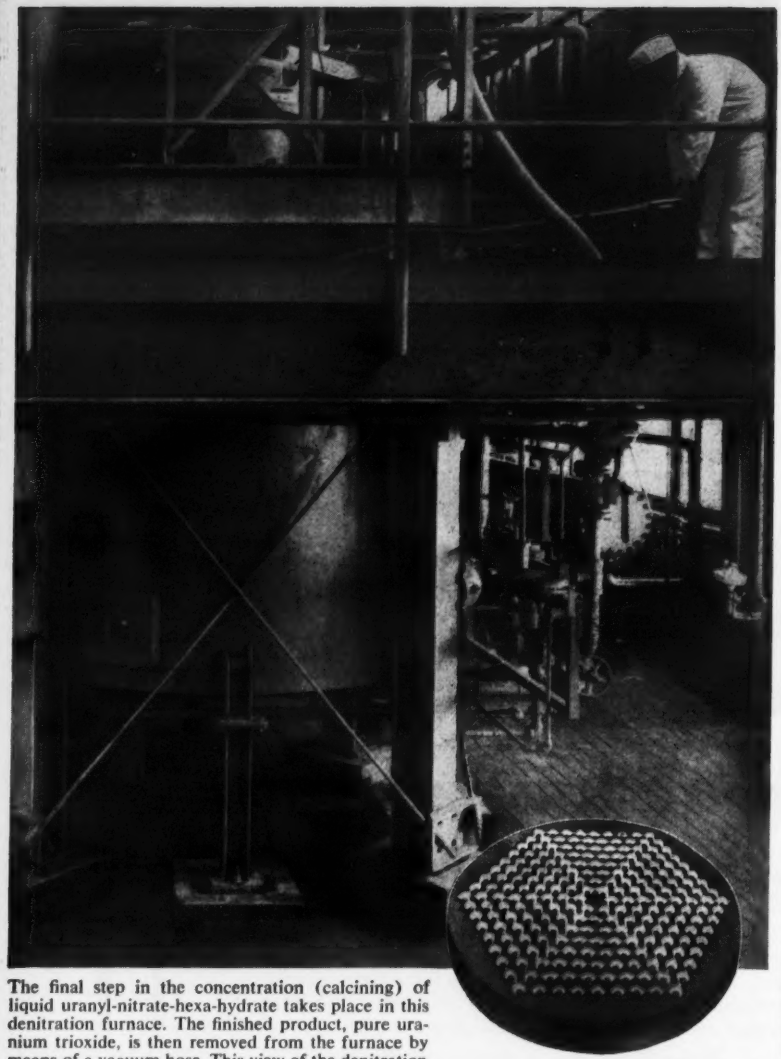
Write for data and nearest distributor.

® *Fluoroflex is a Resistoflex trademark, reg., U.S. off.* ® *Teflon is a DuPont trademark.*

Originators of high temperature fluorocarbon hose assemblies

Resistoflex
CORPORATION
Roseland, New Jersey • Western Plant: Burbank, Calif. • Southwestern Plant: Dallas, Tex.

Check 3727 opposite last page.



The final step in the concentration (calcining) of liquid uranyl-nitrate-hexa-hydrate takes place in this denitration furnace. The finished product, pure uranium trioxide, is then removed from the furnace by means of a vacuum hose. This view of the denitration furnace shows both the top and bottom sections. The operator is shown removing the product.

Duradiant burner setting

Quality... Economy... Speed in batch processing with Selas Duradiant® heating

Control in uniformity of heat application and adherence to critical programming requirements are important features of Selas Duradiant heating for batch cooking chemicals, oils, resins, varnishes, inks.

Fast, radiant gas heating, rapid burner response and turndown ratios of 15:1 or more, make Selas settings as versatile as they are controllable . . . enable them to meet any time-temperature cycle within ±2° F, and duplicate it, batch after batch.

Efficient, low-cost Duradiant enclosed or open settings are steel-encased, shipped with all refractory in place for simple installation. "Packaged" equipment may include shop-assembled piping and complete, automatic control instrumentation.

Send for bulletin "Heat Processing Batch Liquids." Address Dept. 152.

Duradiant is a registered trade name of Selas Corporation of America

SELAS CORPORATION OF AMERICA DRESHER, PENNSYLVANIA

Heat and Fluid Processing Engineers

DEVELOPMENT · DESIGN · CONSTRUCTION

Check 3728 opposite last page.

New Filter Cloth Extra Tough Stuff

POLYMAX* Cloth has Remarkable Properties for Heavy Duty Use

What is POLYMAX

POLYMAX is the National Filter Media Corporation's name for filter media manufactured from the new olefin polymers known as "low pressure", "linear", "high density", or "high crystallinity" polyethylene.

Physical Properties

Fabrics manufactured of these new polymers have physical properties which are truly remarkable, when compared to conventional polyethylene or when compared to nylon. Tensile strength and resistance to stretching or elongation are important characteristics of filter media. The following table tells the story.

	Nylon high tenacity	conventional Polyethylene	POLYMAX
Tensile Strength PSI	89,000 to 108,000	11,000 to 35,000	50,000 to 150,000
% Elongation	19 to 24	20 to 80	10—med. orient. 5—high orient.

Physical Characteristics

Filter fabrics will be woven of monofilaments to duplicate existing monofilament Saran and Polyethylene fabrics. Fabrics woven with very fine monofilaments as well as multifilaments are under development.

Temperature Resistance — Shrinkage

POLYMAX has a softening temperature of 260°F and is sterilizable at 250°F. POLYMAX fabrics will be finished so that exposure to temperature in the 230°F-240°F range will result in minimum shrinkage.

Chemical Resistance

In general POLYMAX filter media equals or exceeds the chemical resistance of conventional Polyethylene. Tables for chemical resistance of Polyethylene can be used. POLYMAX shows markedly less effect of immersion in Chlorinated hydrocarbons, gasoline and lubricating oil.

Availability

Immediately available, either in the form of roll goods or sewn filter elements.

*Reg. trademark NFM Corp.

Weavers of Industrial Filter Media for over Fifty Years

NFM NATIONAL FILTER MEDIA Corporation

General Offices & Mills: New Haven 14, Conn.
Western Office and Factory: Salt Lake City 2, Utah
Sales Offices—Representatives

Los Angeles, Calif.: 811 West 7th Street
Chicago, Ill.: 6034 N. Cicero Ave.
Cincinnati, Ohio: Roselawn Center Bldg.
Houston, Texas: 1503 Hadley St.
Oslo, Norway: Nicolai Friis
Johannesburg, South Africa: Edward L. Bateman

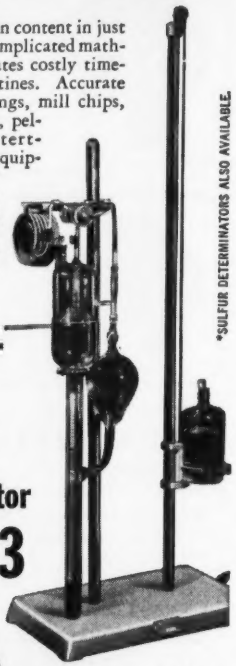
Check 3729 opposite last page.

Highly accurate

2-MINUTE CARBON analysis

IRON · STEEL · PETROLEUM CATALYST · STAINLESS ALLOYS · ORGANIC CHEMICALS · FOUNDRY SANDS

Determine carbon content in just 2 minutes! No complicated mathematics; eliminates costly time-consuming routines. Accurate analysis of borings, mill chips, crushed samples, pellets, etc. Dietert-Detroit testing equipment widely used in company laboratories and institutions of every description for over 18 years.



*SULFUR DETERMINATORS ALSO AVAILABLE.

DIETERT-DETROIT CARBON Determinator NO. 3003

for the asking

Free Dietert-Detroit 16 page Catalog illustrates both Carbon and Sulfur Determinators and complete line of accessory equipment.

HARRY W. DIETERT CO.
CONTROL EQUIPMENT
9330 ROSELAWN · DETROIT 4, MICHIGAN

Send me your Carbon-Sulfur Determinator Catalog.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

Check 3730 opposite last page.

NEW LITERATURE

Crystallizer uses, data

Manufacturer's line of evaporator, vacuum, cooling, and batch-type crystallizers are covered in 16-page bulletin. Applications, operating features, and economies are reviewed. Bul CE 57 — Struthers Wells Corporation, Warren, Pennsylvania.

Check 3731 opposite last page.

High-temp water heaters

Ten-page brochure tells advantages of forced-circulation high-temperature water generators in supplying process heat to 750°F. Typical installations are illustrated. Bul 700 — The International Boiler Works Co., East Stroudsburg, Pennsylvania.

Check 3732 opposite last page.

Compacting process

Manufacturer's bulletin gives details on compacting process that features precise control of particle size, density, and solubility factors. Bul O7B-8836 — Industrial Equipment Div., Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 3688 opposite last page.

Anaerobic incubators

Data sheet details features and specifications of anaerobic incubator for growing aerobes to strict anaerobes by accurate control of gases and variable pressures. Bul 56111-1 — National Appliance Company, 7634 S.W. Capitol Hwy., Portland 19, Oregon.

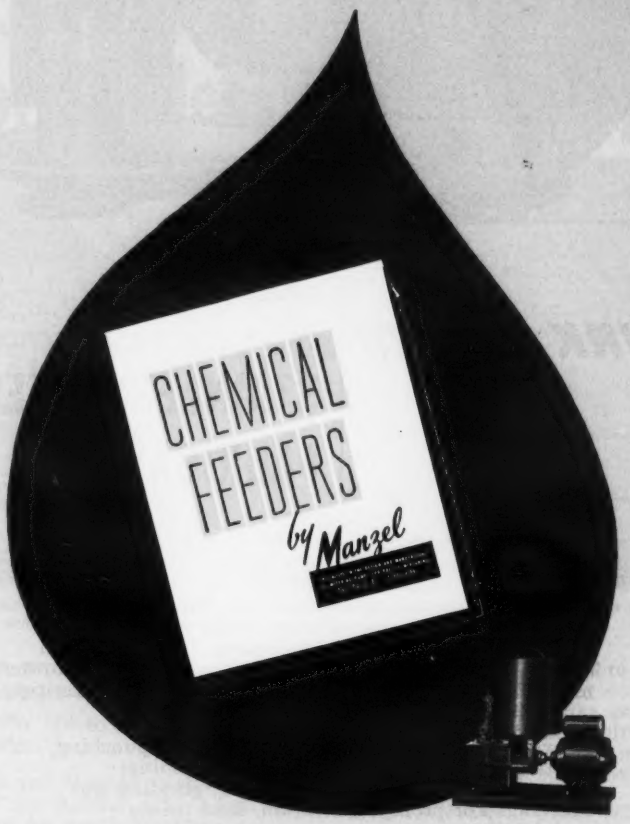
Check 3733 opposite last page.

Oils, resins data

File-type folder of six pages lists and describes specialty products of manufacturer including thermoplastic resins and aromatic oils. Specialty products bul — Kendall Refining Co., Bradford, Pa.

Check 3734 opposite last page.

select the right MANZEL **chemical feeder** from this **new catalog**



WHATEVER YOUR REQUIREMENTS for liquid metering, be sure to get the *exact* unit you need . . . with this new Manzel Chemical Feeder Catalog. It's the most complete, most useful catalog on metering pumps ever published. Gives detailed engineering data, with recommendations for handling *specific* chemicals, acids and other liquids. Thirty-six pages of valuable information designed to help you select the correct proportioning pump. **WRITE FOR YOUR FREE COPY** and take the guesswork out of metering pump selection.

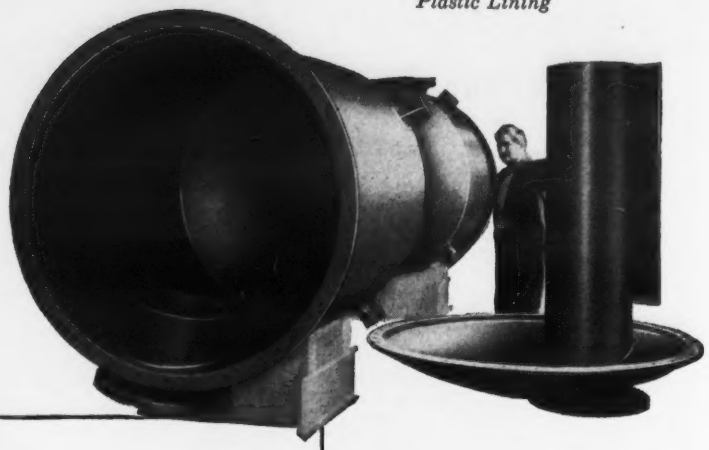
Manzel

274 Babcock Street • Buffalo 10, New York

Specialists in metering pumps and lubricators since 1898

Check 3735 opposite last page.

Pulp Tank prepared for Plastic Lining



KIRK & BLUM *offers specialized experience in*

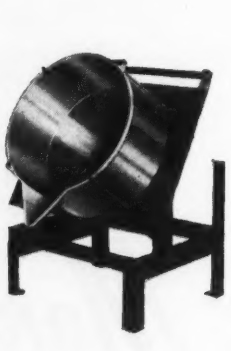
STAINLESS STEEL FABRICATION

Stainless fabrication is distinctively different from conventional steel working. The Kirk & Blum organization has the special knowledge and technique required . . . and the experience and necessary equipment for this highly specialized type of work. With 47 years of experience in sheet metal fabricating, Kirk and Blum offers quality workmanship, economical fabrication to the most exacting specifications . . . in large or small quantities.

Complete facilities to ¼" capacity for: square or rotary shearing; braking, forming, rolling; punching, riveting, drilling; arc, spot and seam welding; inert gas and submerged arc welding; grinding and finishing. For prompt quotation, send prints and details.

THE KIRK & BLUM MANUFACTURING CO.
3133 FORRER STREET
CINCINNATI 9, OHIO

Literature on request:
"SHEET and PLATE FABRICATION"
"ELECTRICAL ENCLOSURES"



KIRK & BLUM **METAL FABRICATION**
We Bring Your Prints to Life

Check 3736 opposite last page.

NEW LITERATURE

Handling costs cut 33%

Fork lift truck manufacturer's report describes in detail improved efficiency resulting from use of expendable cardboard pallets employed in combination with hydraulically operated side-shifter fork truck attachments. Bulky steel containers have been eliminated and handling costs cut 33%. Certified Survey 179 — Towmotor Corporation, 1226 East 152nd St., Cleveland 10, Ohio.

Check 3737 opposite last page.

Proper shaft seal

Manufacturer of shaft seals for every service, from hot or cold water to the most destructive acids and corrosives, offers bulletin containing information on Teflon and other seals for various applications. Bul S-204-3 — Crane Packing Co., 6421 Oakton St., Morton Grove, Ill.

Check 3334 opposite last page.

Sludge dispersal

Treatment which dissolves sludge in fuel oil storage tanks and equipment into combustible material, and emulsifies condensate water as protection against rust and corrosion, is described in manufacturer's bulletin FO-157 — The North American Mogul Products Co., Standard Bldg., Cleveland 13, Ohio.

Check 3738 opposite last page.

Flow meter selection

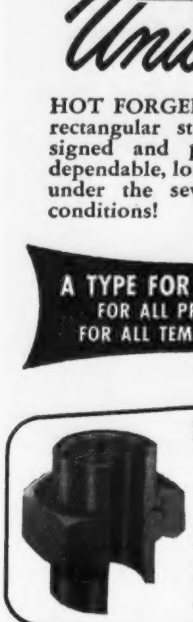
Bulletin of four pages serves as convenient guide to aid prospective users of company's flow meters in selection of appropriate meter for specific application. Die-cut disc, eyeletted on inside cover of bulletin, serves to indicate pressure and temperature limitations of manufacturer's rotameters as well as their flow capacity ranges. Bul 110 — Brooks Rotameter Co., Lansdale, Pa.

Check 3739 opposite last page.

Catawissa
PERFECT SEAL
Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

A TYPE FOR EVERY USE!
FOR ALL PRESSURES!
FOR ALL TEMPERATURES!

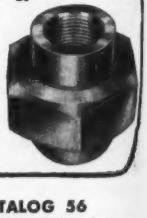


Standard & Double Extra Heavy UNIONS
Available with screwed or socket weld ends. 3000-lb. sizes ⅛" to 3"; 6000-lb. sizes ⅛" to 2".

ORIFICE UNIONS
With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

MALE & FEMALE UNIONS
With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.

FULL STAINLESS & FULL ALLOY STEEL UNIONS
With screwed or socket weld ends. 3000-lb. and 8000-lb. service.



WRITE FOR CATALOG 56
showing the complete Catawissa line of Perfect Seal Products

CATAWISSA VALVE AND FITTINGS COMPANY
620 Mill St. • CATAWISSA, PA.

Check 3740 opposite last page.

NEW LITERATURE

Polyurethane elastomer

Twenty-page booklet details physical properties and characteristics, under various conditions, of polyurethane elastomer, Genthane-S. Fillers, plasticizers, processing, and curing are discussed. "Genthane-S" — Chemical Div., The General Tire & Rubber Co., Akron, Ohio.

Check 3741 opposite last page.

Steel flooring described

Five different types of steel for floors, stairs, steps, ramps, catwalks, platforms, and similar applications are described in eight-page bulletin which includes tables of safe loads and other engineering data. Bul 50-9 — Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill.

Check 3742 opposite last page.

Rotary dryers

Manufacturer's catalog offers aid in solving pressing, drying, and cooling problems. Rotary flash dryers are featured. Catalog C — Davenport Machine and Foundry Company, Davenport, Iowa.

Check 3656 opposite last page.

Describes water softener

Features of manufacturer's zeolite water softener are described in six-page bulletin. Text explains how company's standard units can be adapted to meet individual plant requirements. Bul 28B7107A — Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 3743 opposite last page.

Pneumatic controller

Catalog of 12 pages discusses motion-balance pneumatic controllers with exclusive regenerative feedback circuit. Cat 53P-4000 — Fischer & Porter Company, 489 Jacksonville Rd., Hatboro, Pa.

Check 3744 opposite last page.

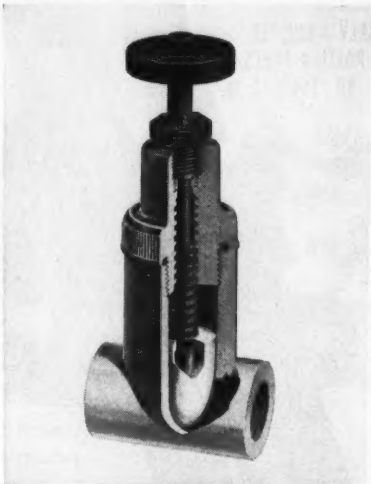
VANTON
Notes on Fluid Handling
PUMPS · PIPE · FITTINGS · VALVES

NEW! ALL-PLASTIC GATE VALVE

The newest in plastic valves is the Vanton "Flex-Plug" gate valve, which combines the no-pressure-drop construction of a gate valve with the close flow-control feature of a globe valve, in all-plastic PVC or Styrene-Copolymer construction. A flexible synthetic cap of Neoprene, Buna N, Hypalon or Kel-F Elastomer* enables the valve to handle abrasives, and permits process flexibility plus easy replaceability without removing the valve from the line.

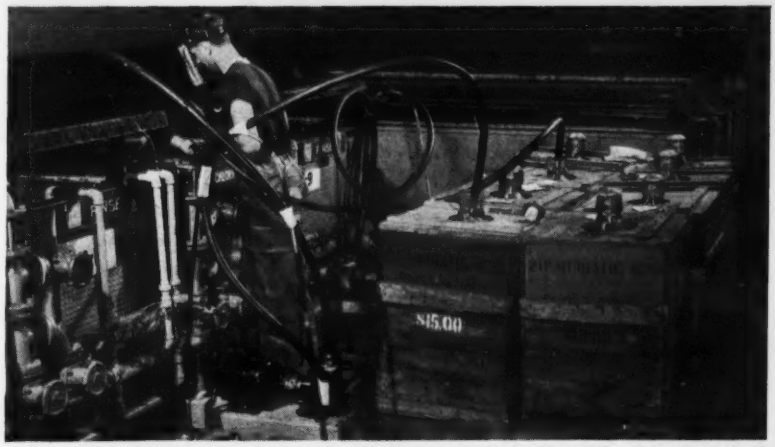
Rated for 150-lb. service, and suitable for vacuum, this valve is at present available in 1" and 2" sizes, and should have wide application wherever corrosives or abrasives must be handled. For more information on the "Flex-Plug" valve, write for BULLETIN 421.

**Reg. trade mark of Minn. Mining & Mfg. Co.*



Reprint Available:
Plastic Pump Handles Etch Solution
Four-page article reprint describes how sealless plastic pump solved the problem of conveying a ferric chloride etch solution in the printed-circuit plant of a large electronic parts manufacturer.
To obtain, write for REPRINT #w11

HCl, HF and H_2SO_4 no match for Sealless Plastic Pumps



Vanton sealless plastic pumps handle HCl and other conc. acids in Chem-Mill etch tanks at North American Aviation's Columbus, Ohio, plant.

Unique pump design means no acid leakage at North American Aviation, Inc.'s Chem-Mill etching tanks

Two 5-gpm Vanton plastic sealless pumps are solving acid handling problems for North American Aviation, Inc., at its Columbus Division jet-fighter plant in Columbus, Ohio. The acids—nitric acid, hydrofluoric acid, sulfuric acid, and hydrochloric acid—are used for the new Chem-Mill chemical etch milling process developed in 1953 by North American.

Main advantage of the new chemical etch-milling technique is that it permits fast, economical removal of excess metal from out-of-the-way spots without endangering part strength. Presently used on aluminum tube, sheet, and forgings, its application is due to be expanded by North American to over 400 aluminum airplane parts, including such things as tapered fuselage skins, access doors, duct skins and leading edges of wings and stabilizers.

The Vanton pumps used to transfer 30% HCl and other corrosive acids to these etch tanks are self-priming, leakproof, and self-lubricating. Key to their success in handling acids is their novel design.

HOW VANTON PUMP WORKS:

The tubular liner is flanged and clamped to the exterior of the molded plastic pump housing by end plates. All fluid pumped is trapped between the outside surface of the liner and the pump housing interior, eliminating shaft seals and packing glands. Inside the flexible liner a rotor, eccentrically mounted on the pump shaft, continuously rolls the liquid from inlet to discharge.

Capacities of the Vanton sealless plastic pump range from ½ to 40 gpm. Liners and housings are made in a variety of plastic materials, to suit a wide range of corrosive, acid, and slurry conditions. For further details, write for CATALOG 101

VANTON PUMP and Equipment Corp. • Hillside, N. J.
DIVISION OF COOPER ALLOY CORP

Check 3745 opposite last page.

any chemical your process equipment and tubing can handle—

metallo gaskets can seal!

SUPERIOR QUALITY REFLECTED IN LOW MAINTENANCE COSTS!

METALLO STYLE 3 — Single Jacketed with .008 to .019 metal jacket enclosing one face and both edges. Filler can be asbestos, #2300* sheet packing, rubber, teflon or as specified. These gaskets have a wide range of uses including air, ammonia, chemical, oil and steam lines. They are easily compressed, blow-out proof and resistant to temperatures up to 750 F.

METALLO STYLE 4 — Double jacketed with .008 to .019 metal jacket enclosing both faces and edges. #2300* or other filler as specified. Recommended for high temperatures, pressures and severe working conditions. Added protection and strength of double metal jacket. Asbestos or #2300* filler permit sufficient compression to insure efficient sealing of joints without strain on bolts.

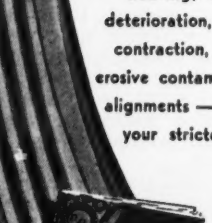
METALLO 2-PIECE FRENCH STYLE — 2-piece .008 to .019 metal jacket enclosing inside edge. Used where width of gasket prevents use of one piece shell combination. Recommended where bolting is relatively light or where vibration or sudden temperature variations are encountered. This style is resilient and easily compressed. Same as other French Styles except for greater flange width.

SPECIAL GASKETS FOR HEAT EXCHANGERS We are prepared to supply gaskets for heat exchangers and similar equipment made of metal jackets with asbestos, #2300* or compressed asbestos sheet fillers or solid metal. They can be supplied in any size up to the limit of transportation facilities.

Because Metallo makes so many stock, special and custom gaskets, you need not worry whether the precise gasket for your sealing requirements will be available. It always is—from Metallo. You can be sure that there is a Metallo Gasket in stock or one will be made quickly that is designed specifically for your every connection problem—every material problem—in the chemical processing field.

Each Metallo Gasket is constructed to meet extreme conditions of thermal and physical shock, vibration, weaving; endure chemical deterioration, expansion and contraction, corrosive and erosive contaminants and misalignments — yet conform to your strictest performance requirements.

Send for our new 20 pg. Gasket Catalog.



ORDERS GIVEN IMMEDIATE ATTENTION

See our catalog pages in CEC • page 1160

metallo gasket co.

29 BETHANY ST. • NEW BRITAIN, CONN.

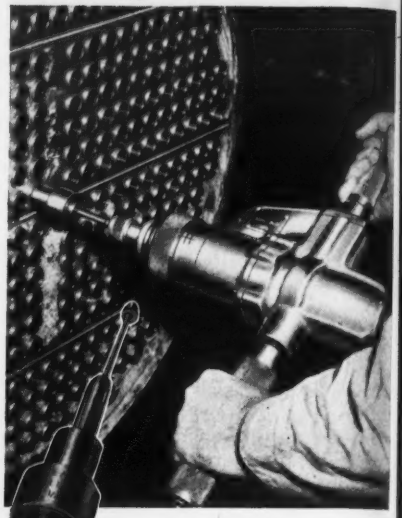
*No. 2300 is a special composition filler that is for use up to temperatures of +2300° F with suitable metal jackets.

Check 3746 opposite last page.

Roll tubes automatically to uniform accuracy!

AIRETROL is a great new advancement in automatically controlled tube rolling. It combines a powerful pneumatic motor drive and precision control into one compact, lightweight, easy-to-operate tool.

Simple adjustment sets AIRETROL to correct expansion. Torque sensing cam controls expansion automatically to .001 of an inch.



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TUBE EXPANSION CONTROL

EASY TO OPERATE...

QUICKLY ADJUSTED FOR ROLLING TUBES ¼" TO 1½" I. D.

AVAILABLE SPEEDS: 700, 550 AND 400 RPM

AIRETROL eliminates guesswork . . . there's no over or under expansion. Every tube joint can be rolled to maximum tightness and holding strength, assuring longer service.

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PNEUMATICALLY OPERATED

AIRETROL's cushioned shut-off prevents sudden shock or strain on operator. Entire cycle is smooth, fast, easy. Average operator can roll up to 12 tubes per minute with AIRETROL.

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EUROPEAN PLANT: Vlaardingen, The Netherlands.
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AIRETOOL
MANUFACTURING COMPANY
SPRINGFIELD, OHIO

Check 3747 opposite last page.

Process control

Details on recorders and recording control stations for control of related variables through a common valve, and for centralized control of batch processes, are provided in bulletin furnished by manufacturer. Bul 13-18A — The Foxboro Company, 812 Neponset Ave., Foxboro, Mass.

Check 3612 opposite last page.

Self-priming pumps

Manufacturer's data sheets and application guide on "Twin-Lobe" positive displacement pump are available. Of rotary design, pumps are self-priming, high-vacuum, efficient enough to move volatile gases or viscous liquids. Bul GTA/TLP-57 — Manton Gaulin Manufacturing Co., 55 Garden St., Everett 49, Mass.

Check 3711 opposite last page.

Organics, inorganics, uses

Properties and typical applications of more than 100 inorganic and organic chemicals are described in 16 pages. Bul S-124 — Pennsalt Chemicals Corp., 3 Penn Center, Philadelphia 2, Pennsylvania.

Check 3748 opposite last page.

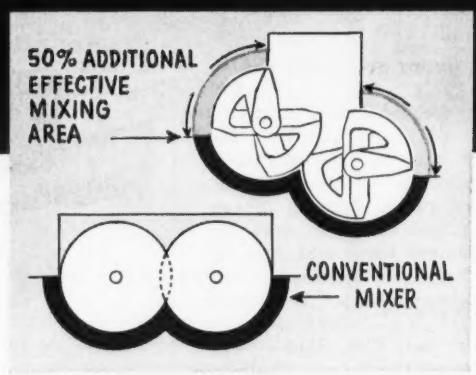
Viscometer manual

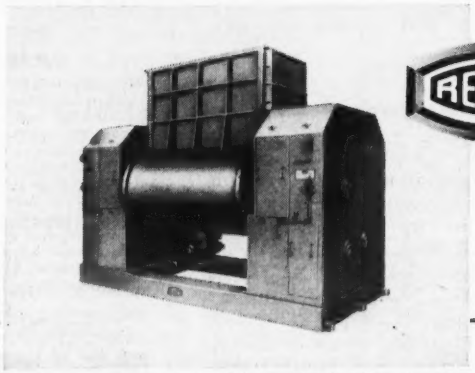
Principles of viscometer operation and calibration are described, diagrammed, and illustrated in 16-page manual. Give model and serial numbers of manufacturer's instruments when requesting manual VIM 57 — Brookfield Engineering Laboratories, Inc., Stoughton, Mass.

Thioglycolic acid

Twenty-page catalog deals with properties, reactions, and uses of thioglycolic acid. "Thioglycolic Acid" — Evans Chemetics, Inc., 250 East 43rd St., New York 17, N.Y.

Check 3749 opposite last page.





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The special design of this Readco mixing bowl provides a 50% greater effective mixing area. Overlapping sigma arms operate at minimum clearance from the shell, prevent build-up of materials, speed dispersion. The design also permits maximum heat transfer from the jacket.

You'll get complete dispersion, consistent mixing, in substantially shorter cycles. Working capacities range from 150 to 900 gallons. Write for complete information.

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THE *Marion* MIXER

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Check 3752 opposite last page.

NEW LITERATURE

Anti-caking agent

Four-page bulletin gives information on sub-micron size sodium silico aluminates used as anti-caking, parting, or bulking agent, and also as moisture barrier and sponge in chemical and food products. "Zeolex bul IPD-8-5" — J. M. Huber Corp., Chemical Div., 100 Park Ave., New York 17, New York.

Check 3753 opposite last page.

Ball valves

Literature describes manufacturer's double seal ball valves. Valve materials can be stainless, aluminum, bronze, or steel, with Teflon or synthetic rubber seals. They are said to handle acids, abrasives, slurries, dry powders. Double Seal Ball Valve literature — Jamesbury Corp., New Street, Worcester, Mass.

Check 3436 opposite last page.

Instrument accessory cat

Complete information on accessories and supplies for manufacturer's instruments is compiled in 60-page catalog. Specifications, part numbers, and prices for more than 250 instrument parts and supplies are listed. In addition to alphabetical index, illustrated catalog is sectionalized for handy use. Cat 500 — The Foxboro Company, Foxboro, Massachusetts.

Check 3754 opposite last page.

Uranium papers

Volume contains all papers of 1957 symposium on uranium and uranium dioxide conducted by the Institute of Metals Division of The Metallurgical Society of AIME. To obtain "Nuclear Metallurgy," Volume 4, remit $7 (AIME members $5) direct to American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc., 29 West 39th St., New York 18, New York.

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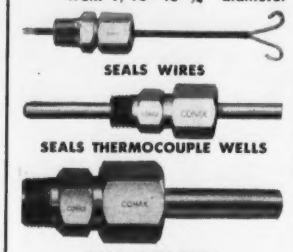

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CONAX Packing Glands compress the "soft" sealant against any kind of tube, rod or wire with the following advantages:

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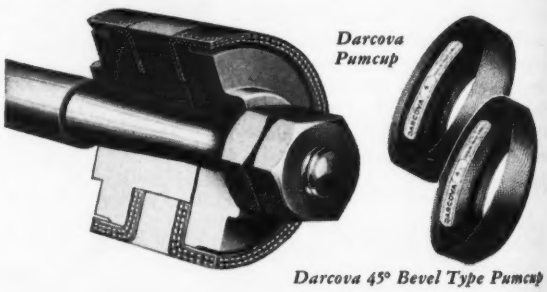

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Darcova 45° Bevel Type Pumcup

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- in reciprocating pumps
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With Darcova Pumcups in your cylinders, there's less fluid slippage. High volumetric efficiency is maintained and Pumcups outlast other packings at least 3 to 1! There's less down-time! Lower power cost! Smoother operation! Less maintenance and replacement!

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When volume of production or quality of product is bottlenecked by a screening problem, find out how Bee-Zee Screens can make a difference! They're designed and dimensioned to deliquefy rapidly and thoroughly... to separate with accuracy and speed. Rod shapes can be selected to counteract unusual clogging or abrasion conditions. Screens are precision-welded by electronic control...special-alloy stainless steel resists rust and corrosion.

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long-life accuracy

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knife-like accuracy

GRIZZLY ROD WITH SKID ROD
ruggedest accuracy

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ENGINEERING COMPANY
728 Abingdon Street, Galesburg, Illinois

Check 3758 opposite last page.

NEW LITERATURE

Microradiography

Folder on projection microradiography contains photos and micrographs which illustrate new instrument and its application. Bul RC-213 — Instruments Div., Philips Electronics, Inc., 750 South Fulton Ave., Mount Vernon, N. Y.

Check 3759 opposite last page.

Packaged air heaters

Describing manufacturer's packaged air heater with uniquely designed high-velocity burner, bulletin gives details of construction. Bul 104 — Thermal Research & Engineering Corp., Conshohocken, Pa.

Check 3385 opposite last page.

Primary amyl acetate

Bulletin of eight pages presents properties, specs and applications of primary amyl acetate. Water extraction and performance data in lacquers are included. Bul F-8911B — Union Carbide Chemicals Co., Div. of Union Carbide Corp., 30 East 42nd St., New York 17, New York.

Check 3760 opposite last page.

Stainless steel welding

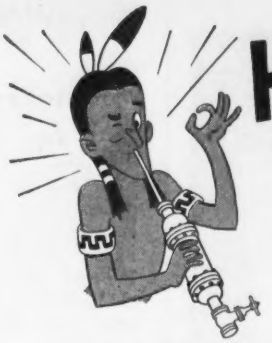
Intended for both experienced and non-experienced welders, 20-page guide answers many questions on how to get best results in welding stainless steels. "A Guide to Better Welding of Stainless Steels" — Arcos Corporation, 1500 S. 50th St., Philadelphia 43, Pa.

Check 3761 opposite last page.

Industrial rectifier info

Illustrated and described in four-page bulletin are DC power supplies for cathodic protection, battery charging, magnetic chuck, and DC motor control. Bul IR-1 — Rapid Electric Co., 2881 Middletown Rd., New York 61, N.Y.

Check 3762 opposite last page.



HOW! PUMP USERS—

SOLVE YOUR NPSH* TROUBLES WITH DEAN BROTHERS STANDARD CENTRIFUGAL PUMPS

These standard, horizontal, centrifugal pumps are designed to operate with low **Net Positive Suction Heads*. This keeps equipment and operating costs down in process industries . . .

- where the pump suction is under low absolute pressure,
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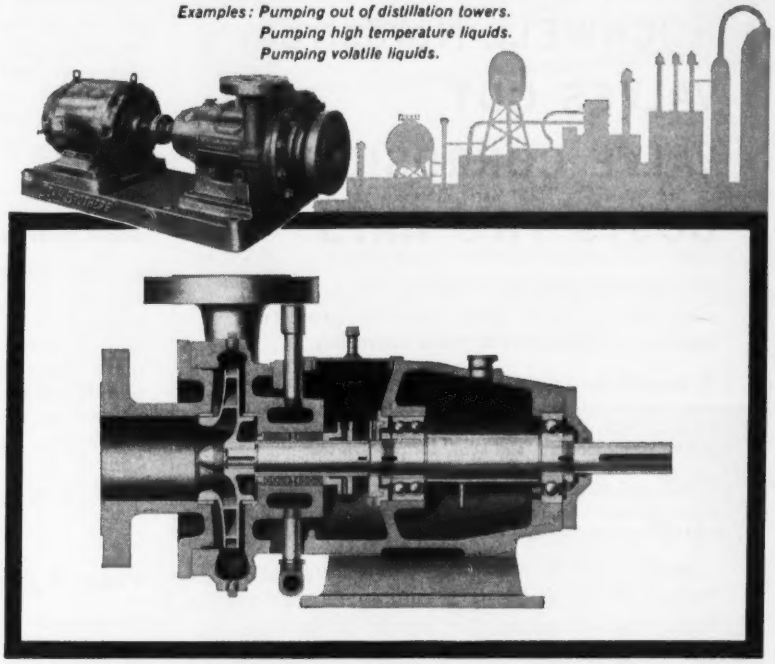
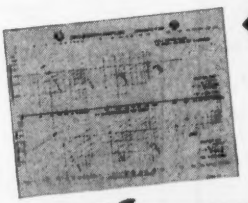
Examples: Pumping out of distillation towers. Pumping high temperature liquids. Pumping volatile liquids.



The low *NPSH* requirements of Dean Brothers standard centrifugal pumps result from the design of the impeller for low inlet losses—without danger of cavitation and the resultant loss of head and capacity.



Dean Brothers offers a series of charts showing the relationship between pump rotative speed, pump capacity and NPSH. Process designers find them valuable in sizing and locating vessels and pumps on flow sheets as well as for the trouble-free application of pumps. They're **free.** Write for Curve No. S-1 A.

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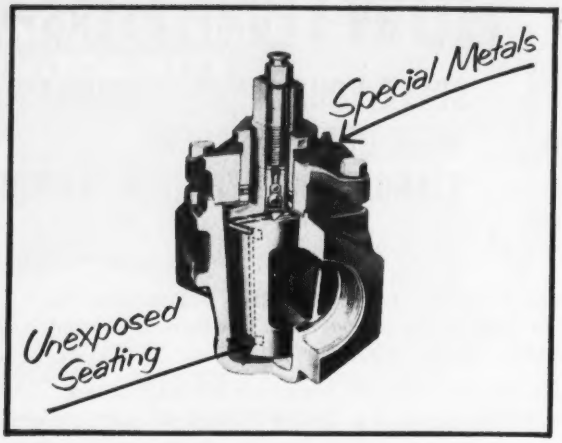

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By specifying Rockwell-Nordstrom lubricated plug valves, you'll have two-way protection against the high cost of valve corrosion.

1. Rockwell-Nordstrom valves have completely unexposed seating areas that can't be corroded or eroded by line fluids. Pressurized lubricant forms a continuous, instantly replaceable "soft seat" for positive shut-off.

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Rockwell-Nordstrom lubricated plug valves are available in a complete range of sizes and pressures for every process industry need. They cost no more to buy, often less, than ordinary valves.

For details, see your supplier or write: Rockwell Manufacturing Co., Pittsburgh 8, Pennsylvania.

Canadian Valve Licensee: Peacock Brothers Limited.

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ROCKWELL-Nordstrom VALVES
it's ROCKWELL
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Check 3764 opposite last page.

NEW LITERATURE

Hydrogen peroxide uses

Up-to-date review and bibliography of application of hydrogen peroxide for epoxidation and hydroxylation is contained in "Hydrogen Peroxide Booklet" — Solvay Process Div., Allied Chemical and Dye Corp., 61 Broadway, New York 6, N.Y.

Check 3765 opposite last page.

Vacuum pumps

Manufacturer's bulletin describes combination two-stage vacuum pump for low micron range. Pump is suitable for either wet or dry systems. Bul 95 — Beach-Russ Company, 50 Church St., New York 7, N. Y.

Check 3786 opposite last page.

Glass instrument care

Booklet of 24 pages offers valuable information and assistance in prolonging life and accuracy of glass measuring instruments. "The Care and Handling of Glass Volumetric Apparatus" — Kimble Glass Co., subs. of Owens-Illinois Co., Toledo 1, Ohio.

Check 3766 opposite last page.

Paper in product design

Illustrated 12-page booklet analyzes uses and advantages of paper as light, versatile, and economical material in product design. "Creative Imagination in the Development of Technical and Industrial Specialty Papers" may be obtained on letterhead request from Knowlton Brothers, Inc., Watertown, New York.

Chemically inert pipe

Installation, features and specifications of manufacturer's channel pipe of chemically inert vitrified clay are presented in four-page bulletin. Chemi-drain channel pipe bul — Logan Clay Products Company, Logan, Ohio.

Check 3768 opposite last page.

Not only does Lenape supply you with superior, SEAMLESS necks ready for attachment, but they cost less than built-up, pipe and flange connections in most sizes.

Get the facts from Lenape. Write today for your copy of a factual cost analysis.

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It's an article in
CHEMICAL PROCESSING
describing a new way of solving
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how these processing problems
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and gives details of how problem
was solved . . . shows results secured.

Take a look at "New Solutions"
articles in this issue—
they might suggest a "solution"
for some of your tough
processing problems.

NEW LITERATURE

Label gluer

Data sheet points out features of time-saving production gluer for pasting any thin, flexible material to any product container, shipping case, or envelope. M-1 data sheet — King Sales and Engineering Co., 441 Folsom St., San Francisco 5, Calif.

Check 3771 opposite last page.

Tonnage filtration

Equipment for high-tonnage filtration and washing of any fast-settling free-filtering product is described in manufacturer's bulletin on horizontal filters. Bul 7201 — Dorr-Oliver Incorporated, Stamford, Conn.

Check 3700 opposite last page.

Chemicals for adhesives

Those interested in bonding of wood, paper, aluminum foil, glass, rubber and plastics will be interested in 66 formulas for hot-melt, solvent, and emulsion adhesives, contained in 24-page booklet. "Neville's Chemicals for Adhesives" — Neville Chemical Co., Neville Island, Pittsburgh 25, Pa.

Check 3772 opposite last page.

For handling hot gases

Application of out-of-circuit fan stack capable of ejecting corrosive, erosive, explosive, product laden, and high-temperature gases to 2000°F is described in four-page bulletin. Bul 572 — Thermix Corporation, Greenwich, Conn.

Check 3773 opposite last page.

Deflashing equipment

Bulletin of eight pages describes deflashing equipment for cleaning and finishing all types of plastic parts. Specifications and application data are also presented. Bul 228 — Pangborn Corporation, Hagerstown, Md.

Check 3774 opposite last page.

Cambridge Surface Pyrometers are light weight, portable instruments—accurate but rugged —for measuring temperature of mold cavities and flat surfaces, still or moving rolls, and within-the-mass temperature of materials in a plastic or semi-plastic state. Write for Bulletin 194-SA; 33 illustrations, many applications.

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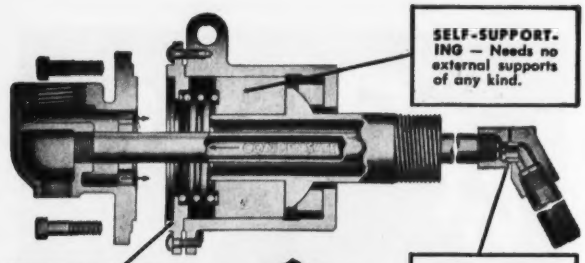
SELF-SUPPORTING — Needs no external supports of any kind.
ASSEMBLY PLATE — Holds internal parts in position when head is removed.
SYPHON ELBOW — Permits use of straight pipe for syphon. Can be inserted or withdrawn right through the joint.

Johnson Rotary Joint with SYPHON ELBOW

Johnson Joints represent the best way industry has yet found to get steam or liquids into rotating rolls and cylinders. They are completely packless, need no lubrication or adjustment. The Type SBP shown gets steam in, condensate out, through the same head. Other types available for through flow service, in sizes to meet all operating needs. ***WRITE FOR COMPLETE INFORMATION.***

The Johnson Corporation
826 Wood St., Three Rivers, Mich.

Check 3778 opposite last page.

NEW LITERATURE

Inter-floor conveyer

Latest developments in automatic inter-floor conveying system for unitized loads are detailed in manufacturer's four-page bulletin. Installation photographs and schematic drawings indicate how various elements can be combined into single system to solve special problems. Bul 6659 — Gifford-Wood Company, Hudson, N. Y.

Check 3779 opposite last page.

Atomic flow controls

Use of manufacturer's liquid level and flow controls at Experimental Boiler Water Reactor, Argonne National Laboratories, Lemont, Illinois, is described in detail in ten-page booklet. Photographs from inside reactor and simplified flow diagram explain complete function of each of 16 of manufacturer's instruments installed as safety controls. "The Power Plant of Tomorrow" — Magnetrol, Inc., 2110 S. Marshall Blvd., Chicago 23, Illinois.

Check 3780 opposite last page.

Engineering assists

Brochure of 12 pages shows how manufacturer's engineering assists in solving problems in evaporation, crystallization, filtration, pulp washing, and spray drying. "An Open Door" — Swenson Evaporator Co., Div. of Whiting Corp., 15667 Lathrop Ave., Harvey Ill.

Check 3377 opposite last page.

Reflectometer data

Manufacturer's news letter shows and discusses automatic recording reflectometer capable of measuring whiteness, degree of yellowness, bleaching and fading, amount of blueing, tinting strength, and a number of other factors. News Letter Vol 4, No 37 — Gardner Laboratory Inc., PO Box 5728, Bethesda 14, Md.

Check 3781 opposite last page.

The trigger action of the Uni-Trap's Dual-Valve opens the large inlet orifice and air and condensate is discharged instantly with a minimum of wear and wire drawing. This permits dry hot steam to deliver maximum temperatures at all times . . . gives you faster warm-up and greater capacity. The Unitrap is completely universal to pressure ranges from 0 to 250 PSI . . . without orifice changes or adjustments. Pipe Sizes ½" through 2".

Bulletin 800 gives you full information on this extremely efficient steam trap. We'll be glad to send it to you.

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GRATING
Dravo I-U-2 safety grating is particularly desirable in areas for public use. Bearing bars are 3/16" thick, spaced 1" or 1 1/8" apart. Cross bars are 2" center to center. Note spacing—an object over ½" square cannot pass through the openings.
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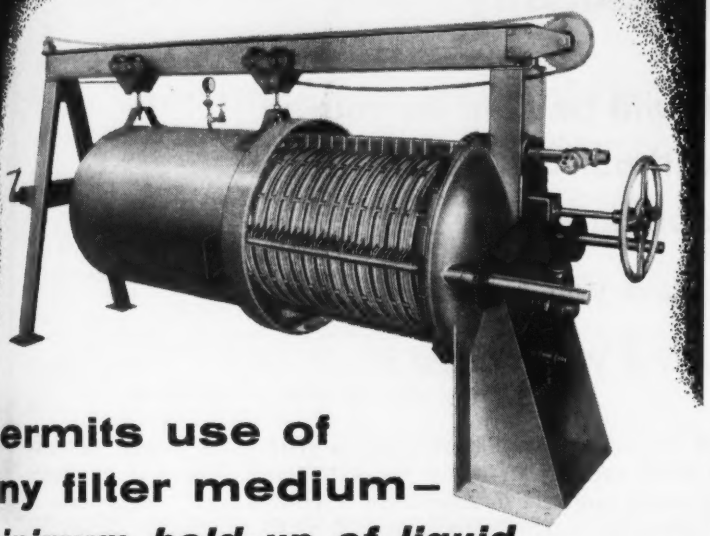
Check 3783 opposite last page.

NEW VERTICAL LEAF FILTER



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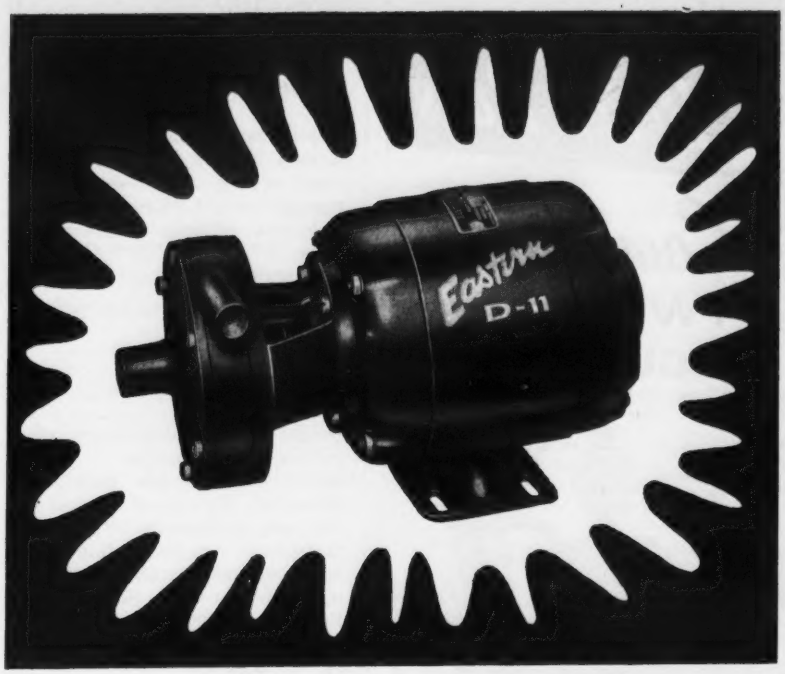

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Check 3786 opposite last page.

NEW LITERATURE

Selecting feeders

Details on selection of rotary airlock feeders for processing requirements are covered in manufacturer's Booklet P-55 — Prater Pulverizer Company, 1513 South 55th Court, Chicago 50, Ill.

Check 3696 opposite last page.

Sulfonates low-down

Origin and manufacture of petroleum sulfonates is described in 12-page bulletin. Behavior, functional properties, and applications of manufacturer's complete line of sulfonates are detailed. Sulfonates bul — L. Sonneborn Sons, Inc., 300 Fourth Ave., New York 10, N.Y.

Check 3787 opposite last page.

Steam-jacketed valves

Revised eight-page bulletin details manufacturer's line of steam-jacketed valves. Principle and operation of nonlubricated split-plug valve are explained and shown in exploded view. Bul 100 — Gato Valve Co., 912 Behan St., Pittsburgh 33, Pa.

Check 3788 opposite last page.

Power reactor guide

Bulletin of 32 pages is application guide for saturable power reactors. Uses, turndown characteristics, and application of automatic control to these units are discussed. Bul F-8383 — Barber-Colman Company, Rockford, Ill.

Check 3789 opposite last page.

Water filter

Manufacturer's catalog describes water filter for use in chemical and allied industries and in municipal treatment plants. Specifications, capacities, and construction details are included. Water filter — Green Bay Foundry and Machine Works, Green Bay, Wis.

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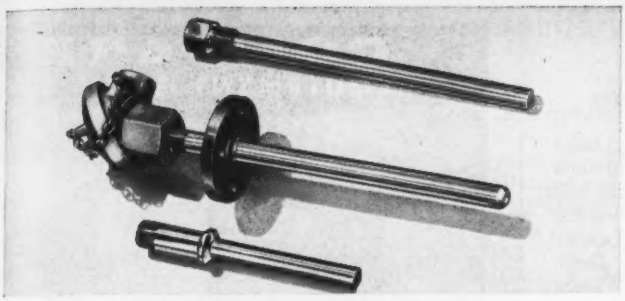

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Thermo Electric Co. Inc.
SADDLE BROOK, NEW JERSEY
In Canada – THERMO ELECTRIC (Canada) Ltd., Brampton, Ont.

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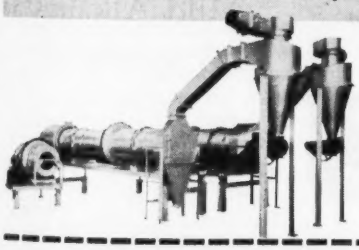

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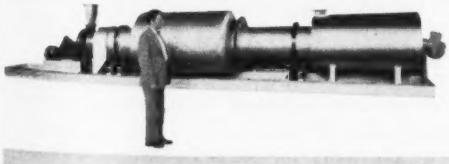

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Check 3792 opposite last page.

NEW LITERATURE

Electrical insulation chart

Handy to file or place above work benches, eight-page French-fold chart is unique ready reference for users of electrical insulation materials in the A, B, and H temperature classes. Over 30 different types of insulation materials are fully described. "Electro Electrical Insulation Selector Chart" — Electro-Technical Products Div., Dept. A, Sun Chemical Corporation, 113 E. Centre St., Nutley 10, N. J.

Check 3793 opposite last page.

Weighing processes

Batch-in, batch-out, and continuous weighing processes are compared in 20-page bulletin on weighing of bulk material. How completely automatic weighing system can be assembled by building-block techniques is explained. Bul 12 — Weighing and Control Components, Inc., 372 Lincoln Ave., Hatboro, Pa.

Check 3794 opposite last page.

Electronics catalog

Distributor of radio and electronic parts and equipment presents 404-page catalog listing over 27,000 items. Special emphasis is placed on equipment for industrial maintenance, research, and production requirements. 1958 Electronics cat — Allied Radio Corporation, 100 N. Western Ave., Chicago 80, Ill.

Check 3795 opposite last page.

Stainless steel filter data

Catalog of 12 pages describes and illustrates porous, centered, stainless steel filters. Selector chart plus filtration data tables are added to help in filter selection. For use with corrosive fluids, units are designed for 1000°F + temperatures. Cat 54-101 — The Cuno Engineering Corp., Meriden, Connecticut.

Check 3796 opposite last page.

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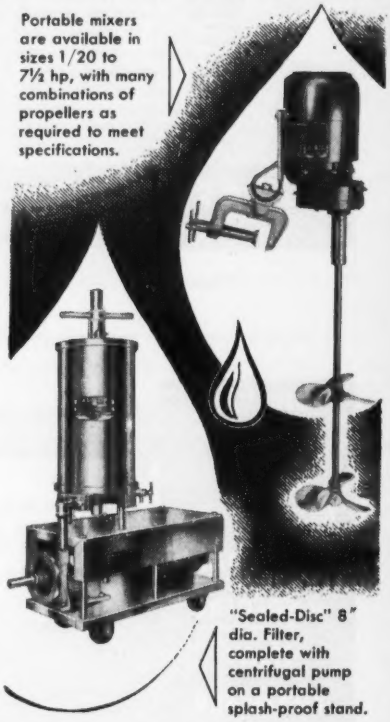

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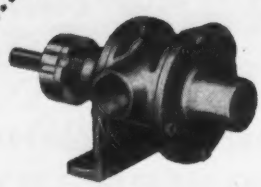

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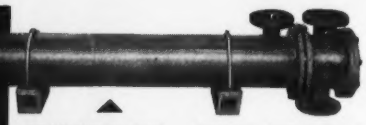

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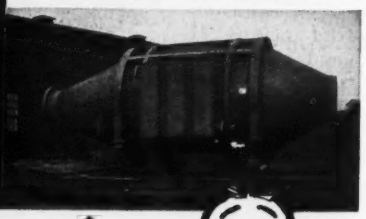

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Check 3799 opposite last page.

NEW LITERATURE

Lift truck control handle

Four-page circular explains features and operating details of control handle for full line of electric "walkie" lift trucks. Circular 34-H — Lewis-Shepard Products, Inc., Dept. R-13, 125 Walnut St., Watertown, Massachusetts.

Check 3800 opposite last page.

High speed straining

Unit designed to deliver continuous liquid or slurry feed free from oversize particles is subject of four-page bulletin. Operation, applications, and advantages of high-speed straining units are detailed. Bul 2700 — Dorr-Oliver Incorporated, Barry Place, Stamford, Connecticut.

Check 3801 opposite last page.

Flexible couplings

Bulletin of 12 pages describes completely different flexible cushion coupling introduced by manufacturer. Full-view and cutaway photographs are included with drawings to illustrate construction and installation features. Bul A-669 — Dodge Manufacturing Corporation, Mishawaka, Ind.

Check 3802 opposite last page.

Details chelating agent

Technical bulletin describes chelating agent that operates in high-pH systems with longer-than-usual sequestrant life. Tech bul 557-1 — Sole Chemical Corp., 27 East Monroe St., Chicago 3, Ill.

Check 3803 opposite last page.

Lift truck attachments

Features and specifications of gripper arm attachments for fork-lift trucks are contained in four-page bulletin. Fork-lift truck attachments bul — Little Giant Products, Inc., 1530-50 N.E. Adams St., Peoria, Illinois.

Check 3804 opposite last page.

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Check 3807 opposite last page.

NEW LITERATURE

Solids-liquid separation

Catalog of 36 pages describes and presents illustrations of metallic media for solids-liquid separation processes. Cat 57 — Multi-Metal Wire Cloth Co., Inc., 1350 Garrison Avenue, New York 59, N. Y.

Check 3808 opposite last page.

Protective materials

Catalog of four pages describes manufacturer's line of corrosion-resistant materials including mastics for floors, acid-proof brick, chemical-resistant mortars, impervious liners, and protective coatings. Bul 1-757 — Ralph V. Rulon, Inc., 3900 N. Second St., Philadelphia 40, Pennsylvania.

Check 3809 opposite last page.

Fail-safe electric brake

Authoritative 36-page illustrated report on electric brake designed for fail-safe applications includes complete explanation of operation, selection factors, torque characteristics, and controls. Tech report WEB 6293 — Warner Electric Brake & Clutch Co., Beloit, Wisconsin.

Check 3810 opposite last page.

Motor controls

Bulletin of eight pages discusses features and applications of synchronous motor control and describes operation of synchronous motors. Bul GEA-5873B — General Electric Company, Schenectady 5, N. Y.

Check 3811 opposite last page.

Epoxidation reactions

Two new procedures for in-situ epoxidation reactions with resin catalysts are in eight-page bul 89 — Becco Chemical Div., Food Machinery and Chemical Corp., Station B., Buffalo 7, New York.

Check 3812 opposite last page.

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ADVERTISERS in this issue

A

Abbé Engineering Co. 227
Abbé Inc., Paul O. 67
Airetool Manufacturing Company 216
Airkem, Inc. 115
Alemite Division, Stewart-Warner Corporation 26
Allied Chemical & Dye Corporation, Baker & Adamson, General Chemical Division ..... 2nd Cover
Allied Chemical & Dye Corporation, National Aniline Division 35
Allis-Chalmers, General Products Division 127
Allis-Chalmers, Industrial Equipment Division 197
Alloy Steel Products Company .... Opp. 122
Allpax Company, Inc., The 25
Alsop Engineering Corporation 225
Amercoat Corporation ..... 4th Cover
American Chain & Cable, Helicoid Gage Division 67
American Hard Rubber Company, Division of Amerace Corporation 205
American Machine & Metals, Inc., Filtration Engineers Division 191
American Machine & Metals, Inc., Niagara Filters Division 70
American Machine & Metals, Inc., Tolhurst Centrifugals Division 71
American-Marietta Co., Valdura Paint Division 110
American Platinum & Silver Division, Engelhard Industries, Inc. 25
American Potash & Chemical Corporation 110
American Steel & Wire Division, United States Steel Corporation 161
American Sterilizer, Scientific Division 18
Amersil Quartz Division, Engelhard Industries, Inc. 23
Ampco Metal, Inc. 81
Anderson Company, The V. D., division of International Basic Economy Corporation 210
Armstrong Machine Works 159
Askania Regulator Company, A Subsidiary of General Precision Equipment Corporation 175
Assembly Products Inc. 171

B

Babbitt Steam Specialty Co. 200
Babcock & Wilcox Company, The, Tubular Products Division 91
Bailey Meter Company, Chemical and Petroleum Division 172
Baker & Adamson, General Chemical Division, Allied Chemical & Dye Corporation ..... 2nd Cover
Baldwin-Hill Company 63
Ballymore Company 178
Barber-Colman Company 170
Bart Manufacturing Corp. 74
Bauer Bros. Co., The 145
Beach-Russ Company 224
Beetle Plastics Corp., Carl N., a Subsidiary of Crompton and Knowles Corporation 229
Belmont Packing and Rubber Company, The 68
Bin-Dicator Co., The 131
Binks Manufacturing Company 198
Bird Machine Company 7
Bisonite Company, Inc. 74
Bixby-Zimmer Engineering Company ... 219
Bridgeport Brass Company 59
Brighton Corporation 195
Brooks Rotameter Company 164
Buffalo Forge Company 173
Buffalo Meter Co. 163
Buflovak Equipment Division, Blaw-Knox Company 186
Burgess-Manning Company, Penn Instruments Division 118

C

Callery Chemical Company ... 107, 109, 110
Cambridge Instrument Co., Inc. 221
Cambridge Wire Cloth Co., The 169
Case Company, J. I. 14, 15
Catawissa Valve and Fittings Company 214
Ceilcote Company, Inc., The 126
Celanese Corporation of America, Chemical Division 105
Chemical and Petroleum Engineering Exhibition 92
Chemical & Power Products, Inc. 160
Chempump Corporation 78
Chicago Eye Shield Company 179
Chicago Pneumatic 72, 73
Chiksan Company, A Subsidiary of Food Machinery and Chemical Corporation 11
Clark Equipment Co. ..... Opp. 138
Cleveland Vibrator Co., The 123
Columbia-Geneva Steel Division, United States Steel Corporation 161
Commercial Solvents Corporation, Industrial Chemicals Department 20
Conax Corporation 218
Cooper Alloy Corporation, Valve & Fitting Division 157
Crane Co. 75, 76
Crane Packing Co. 12
Crawford Fitting Company 208
Crescent Insulated Wire & Cable Co. 204

D

Darling Valve & Manufacturing Co. 218
Darnell Corporation, Ltd. 77
Davenport Machine and Foundry Company 184
Davison Chemical Company, Division of W. R. Grace & Co. 117
Day Company, The 140
Dean Brothers Pumps Inc. 219
Dempster Brothers 138
Diamond Chain Company, Inc., A Subsidiary of American Steel Foundries 141
Dietert Co., Harry W. 213
Dodge & Olcott, Inc. 109
Doerr Glass Company 193
Dorr-Oliver, Incorporated 202
Dow Chemical Company, The 153
Dow Corning Corporation 128
Dracco, Division of Fuller Co. 3
Dravo Corporation 222
Ducon Company Inc., The 54
Du Pont de Nemours & Co. (Inc.), E. I., Elastomer Chemicals Dept. ..... 3rd cover
Durametallic Corporation 198
Dust Suppression & Engineering Company 180

E

Eastern Industries, Inc. 223
Eastman Chemical Products, Inc., Chemical Division, subsidiary of Eastman Kodak Company 108
Eco Engineering Co. 156
Eimco Corporation, The 201
Electric Steel Foundry Company 96
Electro Metallurgical Company, Division of Union Carbide Corporation 152
Engelhard Industries, Inc. 22
Engelhard Industries, Inc., American Platinum & Silver Division 25
Engelhard Industries, Inc., Amersil Quartz Division 23
Engelhard Industries, Inc., Chemical Division 24
Ertel Engineering Corp. 188

F

Falk Corporation, The 199
Fansteel Metallurgical Corporation, Chemical Equipment Division 160
Felt Products Mfg. Co. 222
Filter Paper Co., The, Filpaco Industries 123
Filtration Engineers, American Machine and Metals, Inc. 191
Fischbein Co., Dave 148
Fisher Scientific 195
Flexitallic Gasket Co. 43
Flexrock Company 230
Flexrock Company, Mechanical Packing Division 230
Foremost Food and Chemical Company, El Dorado Division 107
Foxboro Company, The 166, 167
Frantz Co., Inc., S. G. 145
Frederick Iron and Steel, Inc. 205
Frick Co. 169
Fritzsche Brothers, Inc. 103
Fuller Company, Subsidiary of General American Transportation Corporation 142

G

Gaylord Container Corporation, Division of Crown Zellerbach Corporation 133
General American Transportation Corporation, Louisville Drying Machinery Unit ..... Opp. 139
Gifford-Wood Co. 204
Goodall Rubber Company 227
Goodrich Chemical Company, B. F. 111
Goslin-Birmingham Manufacturing Co., Inc. 86
Goulds Pumps Inc. 36
Graver Tank & Mfg. Co., Inc., Alloy Division 158
Gump Co., B. F. 79
Gustin-Bacon Manufacturing Company 16, 17

H

Hall Co., The C. P. 106
Hardinge Company, Incorporated 200
Harrington & King Perforating Co., Inc., The 230
Harrisburg Steel Co., Division of Harsco Corporation 100
Harshaw Chemical Company, The 53
Haws Drinking Faucet Co. 180
Heil Process Equipment Corporation 132
Helicoid Gage Division, American Chain & Cable 67
Hercules Powder Company, Incorporated 104
Highside Chemicals Incorporated 103
Hooker Electrochemical Company 119
Hough Co., The Frank G., Subsidiary—International Harvester Company 62

I

Illinois Central Railroad 55
Illinois Testing Laboratories, Inc. 118
Illinois Water Treatment Co. 184
Industrial Division of Colonial Plastics Mfg. Co., Subsidiary of The Van Dorn Iron Works Co. 82
Industrial Filter & Pump Mfg. Co. 130
Industrial Marking Equipment Company, Inc. 82
Ingersoll-Rand 93
Inland Steel Container Company 146
International Nickel Company, Inc., The 154

J

Jabsco Pump Company 226
Jamesbury Corp. 95
Jelliff Manufacturing Corp., The C. O. 109
Jenkins Bros. 64
Jerguson Gage & Valve Company 118
Johns-Manville 114
Johnson Corporation, The 222
Joy Manufacturing Company 58

K

Kates Company, W. A. 162
Kerotest Manufacturing Co., ... 66
Kirk & Blum Manufacturing Co., The 214
Kybernetes Corporation, The 120

L

LaBour Company, Inc., The ..... Opp. 62
Ladish Co., Tri-Clover Division 151
Lapp Insulator Co., Inc., Process Equipment Div. 187
Lenape Hydraulic Pressing & Forging Co. 220
Lift Trucks, Inc. 144
Link-Belt Company 129, 139
Louisville Drying Machinery Unit, General American Transportation Corporation ..... Opp. 139
Luzerne Rubber Co., The 198

M

Magnetrol, Inc. 175
Manton-Gaulin Manufacturing Co., Inc. 206, 207
Manufacturers Equipment Company, The 220
Manzel, A Unit of Houdaille Industries, Inc. 213
Markal Company, The 226
Marsh Instrument Co., Sales affiliate of Jas. P. Marsh Corp. 164
Martin Engineering Company 144
Marvel Industries, Inc. 144
Master Builders Co., The, Division of American-Marietta Company 226
Matheson Company, Inc., The 204
Mathieson Chemicals 57, 116
Mechanical Products Corporation 188
Metallo Gasket Co. 216
Metals Disintegrating Company, Inc. 10
Micro Switch, A Division of Minneapolis-Honeywell Regulator Company 168
Milton Roy Company 80
Minerals & Chemicals Corporation of America 84, 85
Mixing Equipment Co., Inc. 194
Mix Mor Inc. 188
Moisture Register Co. 170
Molded Fiberglass Tray Co. 123
Monsanto Chemical Company, Organic Chemicals Division 97

N

Narda Ultrasonics Corporation, Subsidiary of The Narda Microwave Corporation 190
National Aniline Division, Allied Chemical & Dye Corporation 35
National Distillers and Chemical Corporation, U. S. Industrial Chemicals Co., Division ..... Bet. 110-111
National Dust Collector Corporation 136
National Engineering Company, Simpson Mix-Muller Division 13
National Filter Media Corporation, The 212
National Lead Company 19
National Tube Division, United States Steel Corporation 161
National-U.S. Radiator Corporation, Heat Transfer Division 17
Neptune Meter Company 174
Newark Wire Cloth Company 183
Niagara Blower Company 182
Niagara Filters Division, American Machine and Metals, Inc. 70
Nordstrom Valve Division, Rockwell Manufacturing Company 220

O

Okadee Company 83
Olin Mathieson Chemical Corporation, Industrial Chemicals Division 116
Olin Mathieson Chemical Corporation, Organic Chemicals Division 57
Oxy-Catalyst, Inc. 40

P

Palmer Thermometers, Inc. 126
Patent Scaffolding Co., Inc., The 93
Pawtucket Manufacturing Company 180
Perfecting Service Co. 222
Petrometer Corporation 164
Pioneer Rubber Company, The 176
Pitt-Consol Chemical Company, A Subsidiary of Pittsburgh Consolidation Coal Co. 112
Pittsburgh Coke & Chemical Co., Activated Carbon Division 113
Pittsburgh Coke & Chemical Co., Protective Coatings Division 155
Potts Company, Horace T., Speedline Stainless Steel Fittings Division 5
Powell Company, The Wm. 203
Prater Pulverizer Company 200
Precision Thermometer & Instrument Co. 164
Pressed Steel Tank Company 178
Protective Lining Corporation 147
Puget Sound Fabricators, Inc. 40
Pullman-Standard Car Manufacturing Company, Subsidiary of Pullman Incorporated 134, 135
Pulverizing Machinery Division, Metals Disintegrating Company, Inc. 10
Putman Publishing Company .... Opp. 63, ... 118, 148, 221, 224

Q

Quaker Oats Company, The, Chemicals Department 106
Quaker Rubber Division, H. K. Porter Company, Inc. 181

R

Rapids Machinery Company 218
Raybestos-Manhattan, Inc., Manhattan Rubber Division 37
Raybestos-Manhattan, Inc., Packing Division 207
Raymond Bag Corporation, A division of Albermarle Paper Mfg. Co. ..... Bet. 146-147
Read Standard, A Division of Capitol Products Corporation 217
Renneburg & Sons Co., Edw. 225
Republic Steel, Steel and Tubes Division 188
Resistoflex Corporation 211
Rietz Manufacturing Co. 184
Robbins & Myers, Inc. 50
Rockwell Company, W. S. 174
Rockwell Manufacturing Co. 209
Rockwell Manufacturing Company, Nordstrom Valve Division 220
Rohm & Haas Company 101
Roper Hydraulics, Inc., formerly Geo. D. Roper Corp., Pump Division 102
Rowe Products Inc. 83

S

Saran Lined Pipe Company 153
Sarco Company, Inc. 98
Schutte and Koerting Company 226
Seiberling Latex Products 131
Selas Corporation of America 212
Sharples Corporation, The 122
Shriver & Company, Inc., T. 223
Simpson Mix-Muller Division of National Engineering Co. 13
Sindar Corporation 107
Sparkler Manufacturing Company 185
Speedline Stainless Steel Fittings Division, Horace T. Potts Company 5
Spray Engineering Co. 221
Spraying Systems Co. 40
Square D Company 123
Standard Conveyor Company 208
Stearns Magnetic Products, A Division of The Indiana Steel Products Company 177
Steel and Tubes Division, Republic Steel 188
Stewart Warner, Alemite Division 26
Strahman Valves, Inc. 181
Struthers Wells Corporation 69
Sturtevant Co., P. A. 218
Sturtevant Mill Co. 66
Sun Shipbuilding & Dry Dock Company 61
Surety Rubber Co., The 230
Swenson Evaporator Company, A Division of Whiting Corporation Bet. 62-63

T

Taber Pump Co. 68
Taylor Instrument Companies 165
Taylor, Stiles & Co. 134
Tennessee Coal & Iron Division, United States Steel Corporation 161
Thermal Research & Engineering Corp. 4
Thermo Electric Co., Inc. 225
Thermon Mfg. Co. 100
Tolhurst Centrifugals Division, American Machine and Metals, Inc. 71
Trent, Inc. ..... Opp. 123
Tube Turns, A Division of National Cylinder Gas Company ..... Bet. 98-99

U

Union Asbestos & Rubber Company 99
Union Iron Works 196
U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation ..... Bet. 110-111
U. S. Stoneware 137
United States Gasket Company, Plastics Division of Garlock 56
United States Gauge, Division of American Machine and Metals, Inc. 60
United States Steel 161
United States Steel Export Company, United States Steel Corporation 161
United States Steel Supply Division, United States Steel Corporation 161
Universal Oil Products Company 89

V

Valdura Paint Division, American-Marietta Co. 110
Vanton Pump and Equipment Corp., Division of Cooper Alloy Corp. 215
Vapor Heating Corporation 21
Viber Company 131
Vogt Machine Co., Henry 94
Vulcan Containers Inc. 149

W

Wall Colmonoy Corporation 150
Walworth 8, 9
Webster Manufacturing, Inc. 143
Wellington Sears Company 48
Western Precipitation Corporation 189
West Instrument Corporation 92
Weston Instruments, Division of Daystrom, Inc. 124, 125
Whiting Corporation, Swenson Evaporator Company Division ..... Bet. 62-63
Wiegand Company, Edwin L. 192, 193
Williams & Co., C. K. 81
Williams Gauge Co., Inc., The 86
Wisconsin Alumni Research Foundation 40

Y

Yarnall-Waring Company 42
Youngstown Steel Tank Company, The 102

Z

Zonolite Company 74

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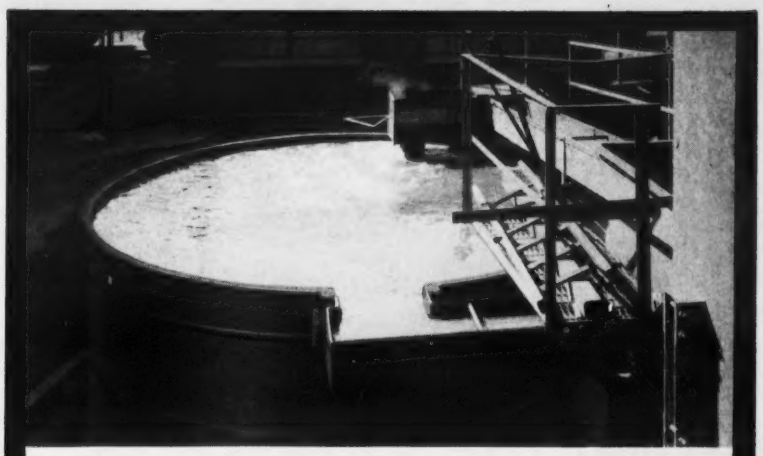

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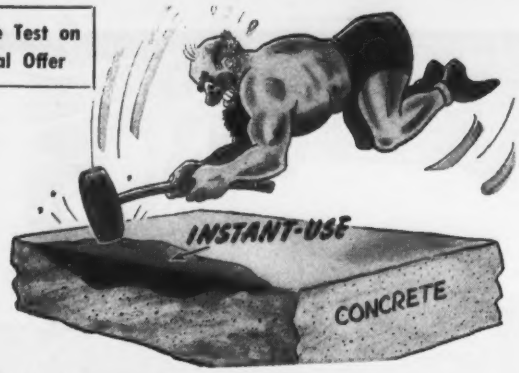

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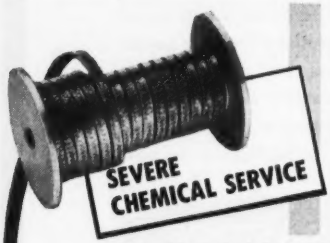

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THAT'S INTERESTING

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Cotton could soon join corn as a man-produced hybrid. This possibility, of immense potential significance to the cotton industry, appears to have moved a long step closer to realization. Work done by Dr. Frank M. Eaton, a University of California scientist and USDA with a "selective gametocide" (sodium alpha, beta-dichloroisobutyrate) has produced hybrid seed formerly obtained only on a small scale by hand methods.

For eye treatment

A West German manufacturer of industrial safety equipment has developed an aid to eye safety. Portable eye washer consists of a plastic squeeze bottle that forces the fluid into the eyecup and expels it to the side after use.

Living high

The average American accounted for almost 25 pounds of natural and synthetic rubber and 181 pounds of sulfuric acid in 1956 through their many end uses. Per capita consumption of newsprint and other paper products amounted to 433 pounds last year. A family of four uses 3212 gallons of petroleum a year at the rate of 8.8 quarts per person per day. (*Better Living,* Du Pont)

Q.E.D.

Seeking to practice what it preaches, The American Brass Co. has used a news release to demonstrate one of the advantages of its product. In announcing the availability of a booklet on commercial applications of copper foil, company used a sample of copper foil as stationery on which release was printed to show how it "stimulates imaginative design possibilities".

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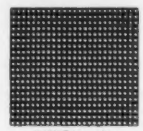
for Grading Sieving Dewatering Filtering Straining • Sterilizing and Tote Baskets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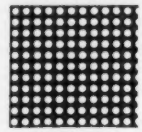
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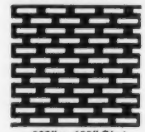
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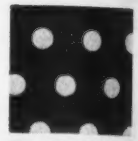
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☐ 3363A	☐ 3416	☐ 3469	☐ 3522	☐ 3575	☐ 3632
☐ 3364	☐ 3417	☐ 3470	☐ 3523	☐ 3576*	☐ 3633
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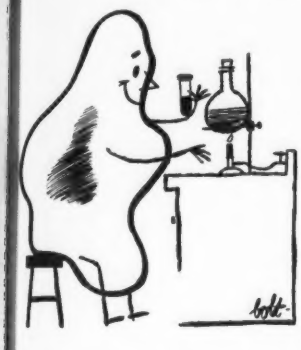
Chemists— of the future

New chemicals, drugs, and nutrients produced by microscopic molds and germs may play increasingly important roles in human life. Scientists at the recent Pasteur Fermentation Centennial predicted that new compounds



may be produced by the artificial culture of plant and animal tissues on a large scale. "The search for organisms which produce interesting chemicals, and the creation of such organisms by induced mutation, are continuing to increase in importance". A number of high-protein micro-organisms, such as yeasts, can be grown cheaply on a diet of starches and sugars, and may provide a partial answer to the food production problem in the future.

Up to date state

Kentucky is keeping pace with the atomic age. Governor Chandler has appointed a director of the new Nuclear Information Division in the Department of Economic Development, Robert H. Solomons. The division has been created to "insure Kentucky's full participation in the progressive changes which will occur as the tremendous potentials of this great new source of energy unfold". The next step will most likely be a space flight sub-section.

More "That's Interesting" articles are on pages 2, 3, 5, 105, 152, 186.

News about HYPALON®

Cover of HYPALON doubles life of elevator belt exposed to 302° F.

Engineers at a large chemical plant faced a problem of finding an elevator belting material that would resist high temperatures. The belt had to lift hot salt 27 feet from a rotary drying kiln to a loading platform. Heat caused ordinary rubber belts to become brittle, crack and rupture at points where the Monel buckets were attached.

A specially designed belt with a cover of HYPALON synthetic rubber did the trick. It lasted 6 months (the best rubber belts lasted only 3 months) driven 188 feet a minute, hauling hot materials. HYPALON gave this service despite the fact that the belt was totally enclosed and operated 80 hours a week.

Elevator belt has cover of HYPALON. Outlasted previous belts 2 to 1 handling hot salt.

The resistance of HYPALON to heat (250° F.-350° F.) is only one of its many useful properties. It offers outstanding resistance to ozone and strong oxidizing agents; resists abrasion, flex cracking, weather. It can be compounded in a wide range of stable colors. Mail coupon for details on how products made of HYPALON can lower operating costs for you.

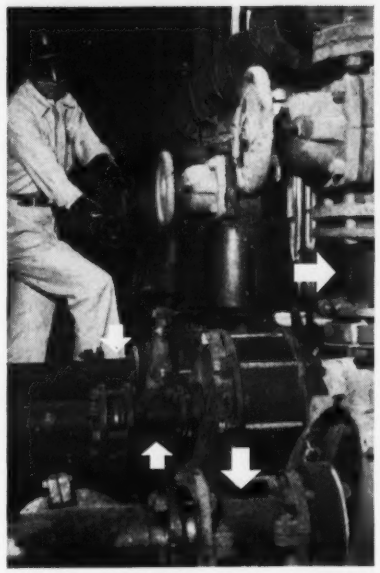
HYPALON *is a registered trademark of E. I. du Pont de Nemours & Co. (Inc).*

Neoprene connectors save $1000 a year on hydrochloric acid pumps

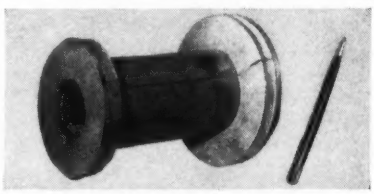
Chemical producer switched to neoprene when pump vibration cracked regular fittings

One of the country's largest chemical manufacturers handles great quantities of hydrochloric acid in making end-use products. Pumps are used to distribute acid from the storage tanks to process points. Trouble arose when the fittings connecting pumps to suction and discharge lines cracked under pump vibration. Several rigid non-metallic materials were tried. All withstood the effect of the acid, but failed mechanically under misalignment stress.

Then the company substituted resilient neoprene connectors for the inflexible materials previously used. They worked. Neoprene connectors – resistant to flex fatigue – can compensate for shifting lines . . . can take distortion without damage. And neoprene connectors are resistant to HCl on the inside, to sunlight and weather on the outside. The change to neoprene saves this company $1000 a year in labor and materials.



Neoprene connectors on acid pumps withstand constant vibration without damage.



Resilient fitting of neoprene takes stress which ruins rigid non-metal types.

In tough service such as this, neoprene's *balanced combination* of properties pays off in longer wear, less maintenance. Neoprene resists acids, abrasion, heat, weather, oil and grease. This Du Pont synthetic rubber is used in a wide variety of industrial applications where conditions are severe. Hose, belting, gaskets, protective lining, safety clothing are examples. Mail coupon below for details on how neoprene can save you labor and expense.

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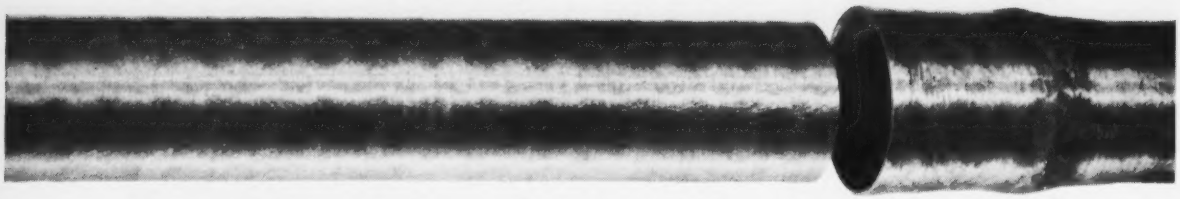
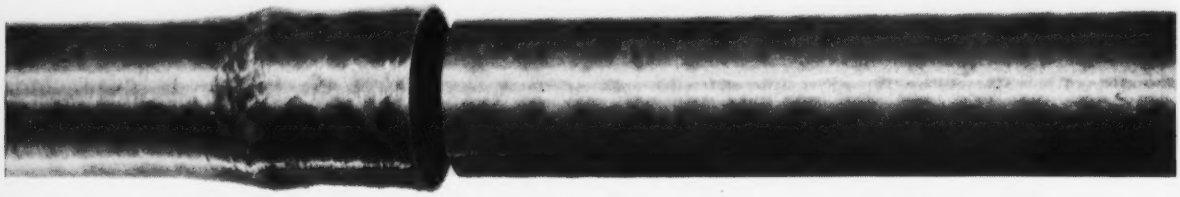
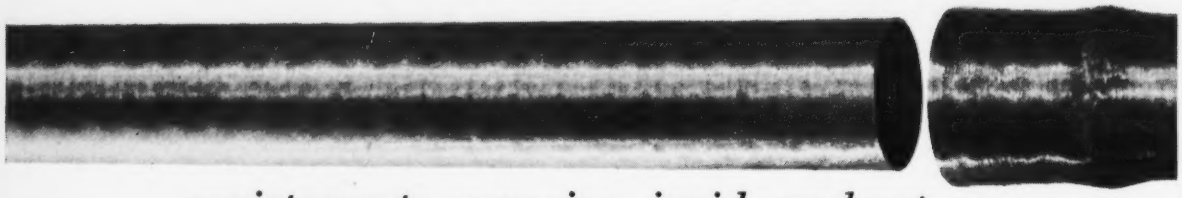


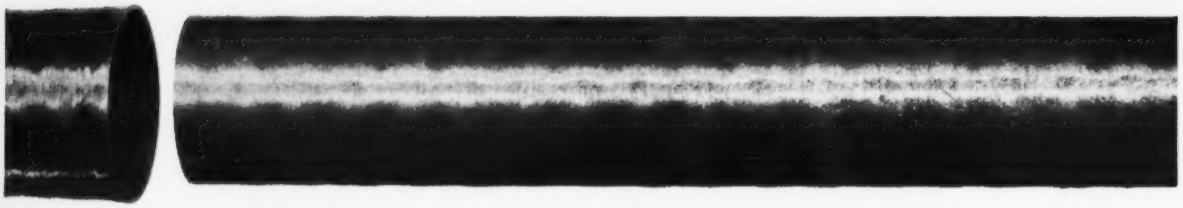
fiber-glass reinforced epoxy pipe... offers a new



combination of light weight, high strength, and



resistance to corrosion, inside and out...



diameters from **2** *inches to* **40** *inches*

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IN THE CHEMICAL INDUSTRY

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- Most dilute acids and alkalis
- Corrosive salt solutions
- Stacks and ducts for chemical fumes
- Vegetable and animal oils
- Foods and beverages
- Petroleum products
- Electrical conduit

Bondstrand is ideal for the piping of fluids which corrode metal pipes, or which are contaminated or flavored by metal.

110

See **BONDSTRAND** *at Booths 68 and 70, NACE Show, Civic Auditorium, San Francisco, March 17-21.*

Check 3820 opposite last page.

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